Determining the Accuracy of Remotely-Sensed Evapotranspiration Estimates for Boreal Forest Ecosystems

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Abstract

Evapotranspiration (ET), which is the sum of water evaporating from the Earth's surface and transpiring through plant stomata, is a major component of the terrestrial water balance. Directly measuring ET with eddy covariance flux towers is costly, so ET is often estimated from the water balance or from energy balance considerations. Many remote regions do not have ground-based hydrological or meteorological stations to provide data for water or energy balance calculations of ET. Among these remote regions is the boreal forest biome, which plays a significant role in modulating climate through carbon storage. The boreal is also susceptible to changes in climate. As the boreal climate warms, some regions will be affected by ET rates that increase faster than precipitation and limit tree growth. In Canada's boreal forest, there are limited continuous and direct ground measurements of ET. A thorough account of ET in Canada is necessary to understand which areas will face these limits and which will benefit from a warming climate and the corresponding longer growing season. Remotely sensed datasets and associated algorithms that provide energy balance parameters have become increasingly important for determining components of Earth's surface water balance. Among them is MOD16, the ET product generated from data gathered by the MODIS sensor affixed on NASA's Terra/Aqua satellite duo. This goal of this work is to determine the accuracy of MOD16 boreal forest ET estimations by comparing them to direct measurements of ET taken at eddy covariance flux towers in Canada's boreal forest. This study tested the hypothesis that Canada's East-West precipitation gradient generates spatial variations in MOD16 accuracy across the boreal forest, with stronger overestimations of ET in the drier, western boreal than in the wetter, eastern regions. This hypothesis was tested at eight flux tower sites located across a longitudinal gradient of the Canadian boreal forest. At each site, I have downloaded and processed MOD16 ET rasters to determine eight-day values for MOD16 ET over the time period that the flux tower was active. These values were then compared to eddy covariance measurements of ET taken at the flux towers, which are gap-filled and aggregated on the same temporal scale as MOD16. Accuracy of MOD16 ET estimations in comparison to flux tower measurements was assessed using root mean square error, percent bias, and bias. Results from the eight flux tower sites indicate that, when all eight day periods for which data exists are assessed, there are not significant correlations between the longitude of a flux tower site and the root mean square error, bias, or percent bias of the MOD16 ET estimation. However, when the eight-day periods are divided based on the meteorological season during which they begin, there are significant ($P < 0.05$) negative correlations between longitude of the flux tower site and the bias and percent bias of the MOD16 estimation, indicating that MOD16 is overestimating ET to a stronger degree at western flux tower sites. Additionally, linear regression analysis of MOD16 ET and flux tower ET for all western flux tower sites, of which there are four, indicated a slope of 0.97 and an intercept of 2.69, higher than the respective values of 0.96 and 2.17 found for the eastern sites. These results may suggest that, when grouped together, MOD16 overestimates ET stronger in the west. However, analysis of the relationship between statistical measures of accuracy, i.e. root mean square error, bias, and percent bias, has largely not indicated that there is a significant correlation between MOD16 accuracy and longitude in the Canadian boreal forest.

Introduction

Evapotranspiration, the process by which water from the Earth's surface is transported to the atmosphere via evaporation from soils, transpiration from plant stomata, and evaporation of intercepted water from tree canopies, is an important component of the global water balance. In Earth's boreal forests, ET is an important aspect of the water balance, which is sensitive to climate. An increase in mean annual temperatures (MAT) without an increase in precipitation can result in an increase in evaporative stress, which is observed in much of Canada (D'Orangeville et al., 2016). An increase in evaporative stress means that ET rates are increasing faster than precipitation rates. Such an increase can limit growth of tree or shift species composition in the boreal. Sites across Earth's boreal forest have been shown to experience an inverse correlation between growth and temperature at a higher rate than the corresponding positive correlation as climate has warmed (Lloyd and Bunn, 2007). Among the sites, those that were dry were more likely to have their growth limited by warming. Tree growth in boreal forests plays a role in the world's carbon balance, as the boreal is estimated to hold 32% of carbon stocks in the Earth's forests and account for 22% of the carbon sequestrated by forests (Pan et al., 2011). Understanding how boreal ET responds to warming is essential to understanding how Earth's ecological carbon cycles respond to warming.

The boreal forest of Northeast North America (NENA), located primarily in Newfoundland and Labrador (NL), has mean annual precipitation (MAP) that is nearly twice what the western and central boreal forests of Canada receive (D'Orangeville et al., 2016). High MAP in NENA reduces the water availability limits imposed by increased evaporative demand, and boreal forests in NENA have shown a positive correlation between growth rates and rising MAT due to the available water (D'Orangeville et al., 2016). Therefore, D'Orangeville et al., suggest that NENA could be refugia for boreal forest species. However, the precipitation data in their study was based on interpolation from widely scattered Environment Canada ground-based stations with additional Provincial stations in Quebec. ET in NL has not been determined using eddy covariance flux towers, the primary method of directly measuring ET based on the flux of heat and water vapor.

ET Measurement with Flux Towers

Eddy covariance flux towers measure ET by measuring the flux of heat energy and water vapor travelling through turbulent eddies of wind (Allen et al., 2011). Three-dimensional sonic anemometers positioned at varying heights on the tower become aligned with the direction of wind, and as eddies pass by, the anemometer records the 3-D wind velocity field, usually at a frequency of 20 Hz. Flux towers are also equipped with fast-response gas analyzers that measure the flux of water vapor and CO_2 from the vertical component of wind velocity (Baldocchi et al., 2001).

The gas analyzers return vertical flux densities of CO_2, water vapor (expressed as latent heat, LE, or λE), and sensible heat (H) between the ground vegetation and the atmosphere. Such vertical flux densities represent the proportion between the mean covariance of the wind's vertical velocity (w') and the scalar fluctuations of the associated gas concentrations

(Baldocchi et al., 2001). Instantaneous deviation from the mean vertical wind speed is represented by w', whereas the scalar fluctuation of gas is represented by c'.

The flux tower fast anemometers record the vertical component of the wind (w), from which instantaneous deviations (w') are derived from the average w over a 30 minute period. Gas flux of CO_2 and water vapor is determined based on the covariance of w' and c' as follows:

$$\text{Gas Flux} = \rho[w'c']_{\text{30-minute mean}} \quad (1)$$

Gas flux is measured in grams m^{-2} s^{-1}, and by convention positive flux densities represent movement of mass away from the surface while negative densities represent movement of mass towards the surface from the atmosphere. To evaluate ET in energy balance equations, sensible heat terms (the flux of temperature, H) and latent heat terms (the phase change of water to water vapor, LE) must be determined and separated.

Data collection at flux tower sites includes continuous measurement of incident short wave radiation, net short and net long wave length radiation, temperature, barometric pressure, and precipitation, which are also measured continuously. LE and H are determined at flux tower sites as follows:

$$LE = Q_E = \rho_{air} L_v \, [w'\rho_v']_{\text{30 min mean}} \quad (2)$$

Latent heat is measured in W m^{-2}, ρ_{air} is the mean density of air, L_v is latent heat of vaporization, and w' and ρ'_v are the instantaneous fluctuations of vertical wind speed and water vapor density in air. Sensible heat flux is calculated using the equation:

$$H = Q_H = \rho_{air} \, Cp \, [w'T'\}_{\text{30 min mean}} \quad (3)$$

where Q_H is sensible heat flux in W m^{-2}; ρ_{air} is mean air density, Cp is the specific heat of air at constant pressure, and T' is the instantaneous fluctuation of temperature. Both LE and H are the product of fluctuations averaged over a 30 minute period.

At the Earth's surface, net radiation is partitioned into LE, H, and soil heat flux (G). All terms are measured by the flux tower and expressed in W m^{-2}:

$$R_n = G + LE + H \quad (4)$$

A diagram of this surface energy balance, and how it involves ET, can be seen in figure 1. In terms of the water balance, ET is expressed as the amount of water removed by evaporation and transpiration:

$$\Delta\text{Storage} = \text{Precipitation} - (\text{ET} + \text{Runoff}) \quad (5)$$

As such, the energy budget at the Earth's surface is tied to the water balance, as it controls the amount of water that is evapotranspired and thus how much water is available to plants. Increasing net radiation without increasing precipitation leads to an increase in evaporative stress, usually expressed as a ratio of precipitation to potential ET (the amount of ET that would occur if water was available). This idea has been used to explain tree growth rates in the Quebec boreal forests (D'Orangeville et al., 2016).

Turbulent gas flux data are measured from the tower's "footprint", which generally extends outwards in the upwind region about 100 times the height of the sensor in question (Ramoelo et al., 2014). Depth of evapotranspired water in the flux footprint is determined based off the LE and air temperature measurements taken by the flux tower's anemometers (Mu et al., 2011).

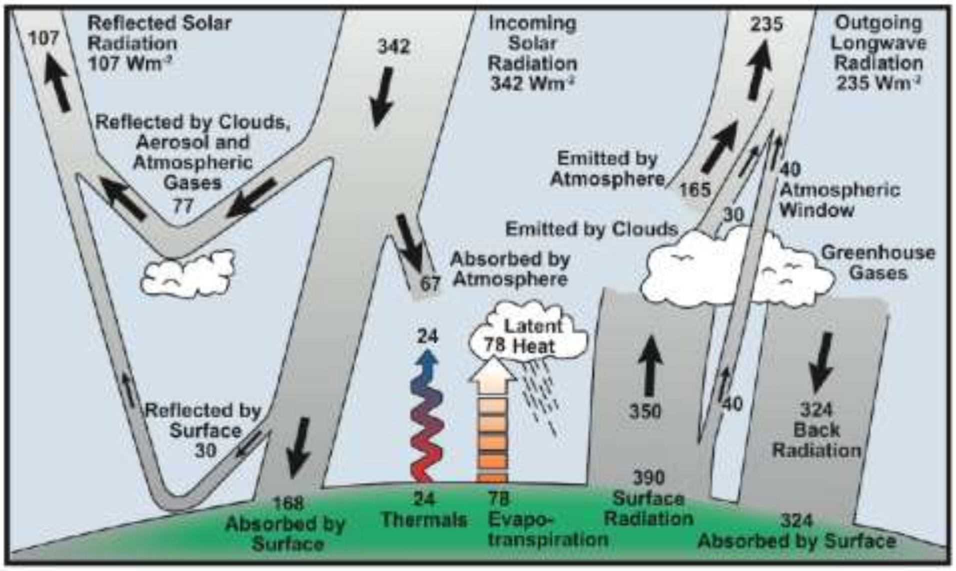


Figure 1: The energy balance at the earth's surface. Evapotranspiration is tied to the flux of latent heat from the ground and is determined by net radiation. From Kiehl and Trenberth (1997).

ET Estimation with Remotely Sensed Data

While flux towers offer constant and direct measurements of ET, they are spatially limited by their footprints. Their maintenance and operation expenses limit their use, and as a result, there are no FLUXNET towers in Newfoundland, as shown in figure 2. With the advent of remotely sensed data from satellites, however, many researchers have begun estimating ET using algorithms applied to satellite data (Mu et al., 2011, Cleugh et al., 2007, Ramoelo et al., 2014, Hu et al., 2015, Allen et al., 2011). Satellites offer global coverage to estimate ET, which allows researchers to work past the spatial limitations of flux tower measurements. Such satellite ET estimations could be applied to a region like NL that lacks direct measurements.

A popular algorithm for estimating global ET was developed by Mu et al. (2011). Their algorithm, known as MOD16, uses data from the MODIS sensors outfitted on NASA's Terra and Aqua satellites. MOD16 is based on the Penman-Monteith equation of evapotranspiration, which follows an energy balance approach (Monteith, 1965):

$$\frac{\lambda E = s \times A + \rho \times C_p \times (e_{sat} - e)/r_a}{s + \gamma \times (1 + r_s/r_a)} \quad (6)$$

where e_{sat} is saturated water vapor pressure, s is the change in e_{sat} over time ($d(e_{sat})/d(Time)$), and A is energy available as the sum of sensible heat, latent heat and soil heat fluxes (Mu et al., 2011). Variables previously defined in equation 1 are the same. Mu et al. (2011) developed their algorithm as an improvement to Mu et al. (2007), which originally only considered ET to be the sum of evaporation from moist soil surfaces and daytime plant transpiration. Under the new algorithm, MOD16 also includes nighttime ET and precipitation intercepted in the canopy, which is evaporated before it reaches the ground.

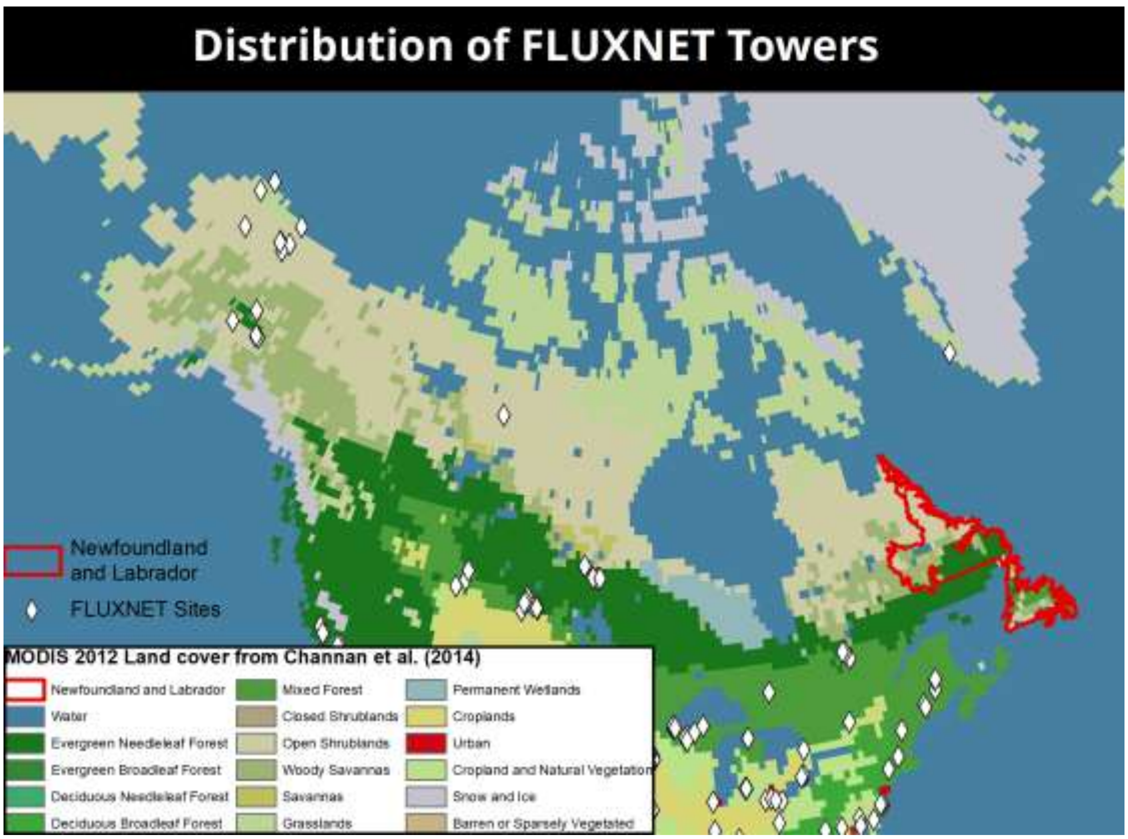


Figure 2: All FLUXNET flux tower sites overlain on the MCD12Q1 land cover classification from Channan et al. (2014), which is derived from MODIS data. These data are open and freely available, but the boreal in NENA lacks any FLUXNET sites.

MOD16 is fundamentally an energy-balance approach to estimating ET that relies largely on remotely sensed variables. Inputs from MODIS include albedo, land cover classification from Channan et al. (2014), leaf area index (LAI), and the fraction of radiation that is photosynthetically active (FPAR). LAI is the ratio of surface area of leaves in a canopy to ground area that the canopy covers, and is dimensionless. Meteorological data, including net radiation, air temperature, air pressure, and humidity, is gathered from NASA's Global Modelling and

Assimilation Office (GMAO) (Running et al., 2017). The meteorological data are available worldwide at a daily resolution and are an amalgamation of directly measured and remotely sensed variables. Figure 3 displays how MODIS and GMAO variables interact to produce the MOD16 product, which is summed over 8 day periods and has a spatial resolution of one square kilometer.

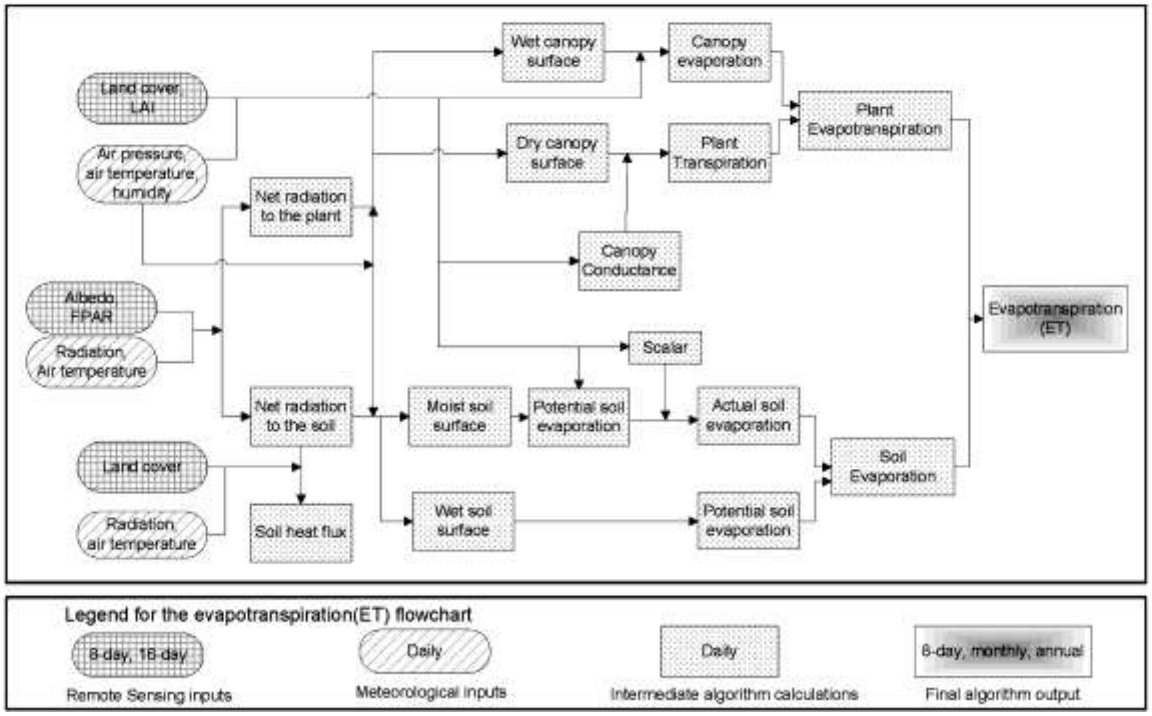


Figure 3: A flowchart from Mu et al. (2011) that outlines how MODIS and GMAO variables are manipulated and related in the MOD16 algorithm.

MOD16 provides temporally-distributed estimates of ET, which is useful for research into how the water cycle evolves seasonally in a given ecosystem. Recent research has focused on validating its estimates by comparing them to flux tower measurements (Mu et al., 2011, Ramoelo et al., 2014, Hu et al., 2015, Tang et al., 2015, Wang et al., 2015). Mu et al. (2011) performed a global validation of MOD16 by comparing its output to FLUXNET sites. Grouping the sites based on MCD12 land cover classification by Channan et al. (2014), they found that MOD16 underestimated ET in evergreen needleleaf (ENF) forest sites by over 30% and overestimated ET in mixed forest (MF) sites by roughly 45%. Much of the Canadian boreal forest lies in one of these two land cover classifications. Ramoelo et al. (2014) found that MOD16 showed poor agreement (R^2 = 0.32) compared to flux tower ET measurements in the savanna of South Africa. Wang et al. (2015) compared MOD16 to flux tower measurements throughout Canada, including in areas that are not considered to be boreal. Their results showed that MOD16 shows little gradient in ET going from the eastern forests with high MAP to the drier, western forests. Given the higher MAP in the eastern boreal shown by D'Orangeville et al. (2016), higher ET would be expected in the east, unless it is limited by temperature. A map of MOD16 annual ET is shown in figure 4.

Statement of Hypotheses:

1. MOD16 ET estimates show a significant correlation in the boreal forests of North America between a flux tower's longitudinal location and the accuracy of MOD16 ET estimation, with higher overestimations of ET in the drier, western regions than in the wetter, eastern regions.
2. The null hypothesis is that MOD16 ET estimation accuracy is not significantly correlated with the longitude of the estimation area.

Methods

Selection of Flux Tower Sites for Comparison with MOD16

Eight Ameriflux flux tower sites have been chosen for comparison (displayed in figure 4); they are CA-Qcu, CA-Man, CA-Obs, CA-Qfo, CA-SJ3, CA-Gro, CA-Ojp, and CA-Oas. Following Mu et al. (2011), towers were not considered for analysis if any of the MCD12 land cover classification pixels in a 3 km radius did not match the land cover classification at the flux tower itself. Such selection is used because MOD16 ET estimations are based in part on the MCD12 land cover at a pixel, since the land cover is used to determine LAI. As such, comparisons should only be made if the flux tower's footprint covers an area that has homogeneous MCD12 land cover.

Found in Quebec, site CA-Qfo is in the eastern boreal and its footprint is characterized by the presence of old black spruce trees and some jack pine and tamarack (Bergeron et al., 2007). The footprint of CA-Qfo has an approximate radius of about 500 m with winds primarily striking the tower from the south and the north-west.

Hydrologically, CA-Qfo is characterized by good to moderate drainage and a water table that is at least 50 cm deep (Bergeron et al., 2007). Tower CA-Qcu, located about 50 kilometers to the southeast of CA-Qfo, represents a similar biome, although the trees that exist there were planted largely in the early 2000's after logging operations took place (Giasson et al., 2006). To ensure that regeneration occurred at a sufficient rate, in 2003 forest managers removed some competing vegetation in a process known as scarification. The site was then restocked with jack pine and black spruce seedlings.

Site CA-Gro is located in Ontario and represents a boreal mixedwood forest (McCaughey et al., 2006) dominated by five main tree species: trembling aspen, black spruce, white spruce, white birch, and balsam fir. This means that the vegetation at CA-Gro is both deciduous and coniferous in roughly equal proportions. Fetch for the tower is estimated to be between 800 meters and a few kilometers (McCaughey et al., 2006). The top of the canopy at this site is 30.3 meters, although this does not represent the average tree height, which is not available.

Together with sites CA-Qfo, CA-Qcu, and CA-Gro, site CA-Na1 is being grouped as an eastern flux tower site. Located in New Brunswick, it experiences wet and temperature conditions in the summer accompanied by winters that see mild temperatures and frequent snow (Xing et al., 2005). Another mixedwood site, trees here include sugar and red maple, red spruce, white spruce, and balsam fir. Balsam fir is the dominant species at CA-Na1, comprising about 95% of the tree volume.

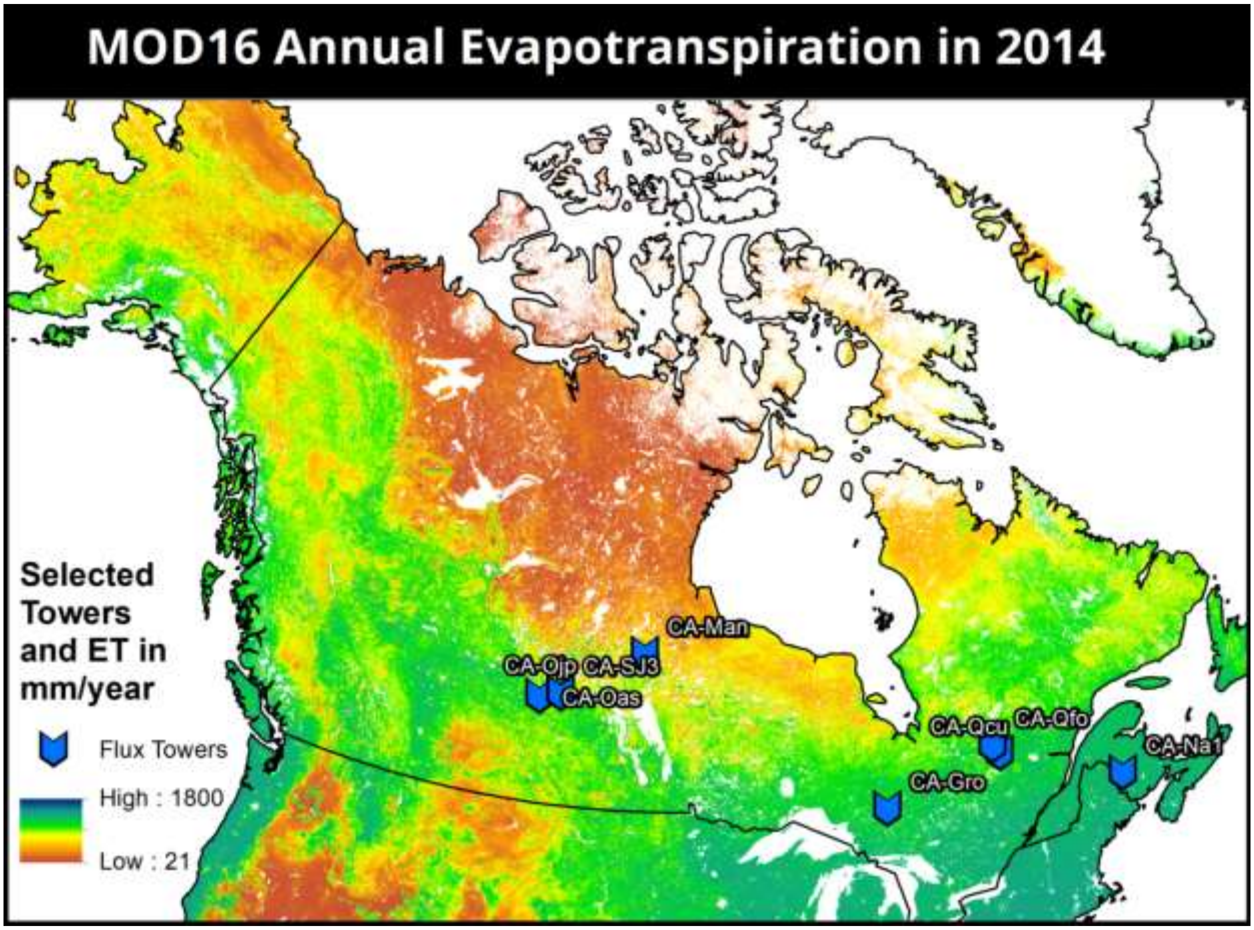


Figure 4: An example of the MOD16 ET product on an annual scale, displayed under the flux towers chosen for this study. These data were downloaded from http://files.ntsg.umt.edu/data/NTSG_Products/MOD16/. Annual ET is not scaled linearly and it is classified according to ESRI's natural breaks classification. Note the lack of ET gradient going from east to west across the boreal.

The other towers, CA-Man, CA-Ojp, CA-Oas, and CA-SJ3, are located in the western boreal forest. At CA-Oas, located in Saskatchewan, tree height averages 7.2 m and MAP is 42.4 cm, representing much lower values than those found at CA-Qfo (Bergeron et al., 2007). Located toward the southern limit of the boreal forest, CA-Oas is characterized by flat topography and is dominated by black spruce. MAT at CA-Oas is higher than the rest of the western sites at 0.34 ^{o}C. Like CA-Qfo, there is also some jack pine and tamarack present. Hydrologically, the water table is considered close to the surface and drainage is characterized as being poor.

Saskatchewan also contains CA-Ojp, which is dominated by the presence of jack pine trees. It has a higher slope and thinner organic soil layer than CA-Oas, which is located less than 100 km away (Griffis et al., 2003). While the mean tree height is not given, its canopy sits at 12.7 meters, lower than the 20.1 meter canopy at CA-Oas. Overall, the forest here is not as dense or developed as CA-Oas.

CA-SJ3, also found in Saskatchewan, is mostly comprised of young jack pine, as the site was harvested in 1975 (Amiro et al., 2006). Site details for CA-SJ3 are rather limited in the literature. CA-Oas represents a more mature site in Saskatchewan, with a forest stand that is roughly 92 years old as of 2019 (Griffis et al., 2004). Here, the terrain is relatively flat and the soil has texture ranging from loam to clay with an organic horizon that is 2-10 cm thick.

Manitoba is home to site CA-Man, which has the highest MAP of western sites at 51.7 cm, but the lowest MAT of all chosen sites at -3.2 ^{o}C (Bergeron et al., 2007). Here the mean tree height is 9.1 m. CA-Man is located toward the northern edge of the boreal in a zone of discontinuous permafrost. The land drains moderately well and is characterized by forests in upland areas and veneer bogs in flatter lowlands. In the forests, vegetation is comprised primarily of black spruce trees, feather mosses, and Labrador tea and wild rose in the understory.

Together, these sites traverse the east-west gradient of precipitation found in the Canadian boreal forest. Their characteristics are summarized in table 1. Site selection is only preliminary at this point and can be expanded if adequate automation of data collection is developed.

Site Name	MAT, ^{o}C	MAP, cm	MCD12 Landcover	Average Tree Height, m	Lat/Lon value
CA-Qcu	0.13	95.0	MF	Less than 8	49.2671, -74.0365
CA-Qfo	0	96.1	ENF	13.8	49.6925, -74.3421
CA-Na1	7.1	110.3	MF	9.6	46.4722, -67.1000
CA-Gro	1.3	83.1	MF	N/A	48.2167, -82.1556
CA-Man	-3.2	51.7	ENF	9.1	55.8796, -98.4808
CA-SJ3	0.13	43.3	ENF	N/A	53.8759, -104.6453
CA-Oas	0.34	42.9	MF	N/A	53.6289, -106.1978
CA-Ojp	0.12	43.1	ENF	7.2	53.9163, -104.6920

Table 1: Summary of flux tower site characteristics. Sites designated as western are shaded in blue, while eastern sites are not shaded. MCD12 landcover is either ENF (evergreen needleleaf forest) or MF (mixed forest). This landcover classification plays a role in the value derived by the MOD16 algorithm.

Flux Tower Data

Flux tower data were downloaded from the Ameriflux website (ameriflux.lbl.gov). For each half hour measurement made by the flux tower, flux tower data were processed to determine ET in millimeters following the equations used by Mu et al. (2011):

$$\lambda = (2.501 - 0.002361 \times T_n) \times 10^6$$
$$ET_n = \frac{LE_n \times 60.0 \times 30.0}{\lambda} \quad (7)$$

in which T_n represents the air temperature for a given half hour period, LE_n represents the latent heat turbulent flux for that time period, and ET_n is the evapotranspiration in millimeters for the time period. Air temperature and latent heat turbulent flux are both provided in the flux tower data file.

There are often gaps in the flux tower LE or T data due to sensor malfunctions, lack of turbulence, or rainfall events. A gap filling technique was used following the methods of Hu et al. (2015), in which values for LE and T taken at the same time on adjacent days are averaged. Following their methods, the values for LE or T taken at the same time are determined for the two days prior to the gap and for the two days following the gap. If at least two out of these four adjacent values exist, the adjacent values were then averaged and inserted in the gap. A day is considered to have valid ET measurements if it has 48 total half-hour measurements after the gap-filling procedure is performed.

MOD16 Data

MOD16 ET data can be downloaded from the University of Montana's Numerical Terradynamic Simulation group (files.ntsg.umt.edu/data/NTSG_Products/MOD16/). For the purposes of this study, the eight day product was used. This product is the sum of ET for each day over an 8-day period. Following Tang et al. (2015), the MOD16 ET value that was used for comparison was an average of nine MOD16 pixels, each one square kilometer, surrounding the tower. To accomplish this, a circular buffer with an area of nine kilometers squared was drawn drawn around each flux tower using ESRI's ArcPy module for Python 2.7. The MOD16 eight day product was then clipped to the extent of this buffer and the average value of the MOD16 pixels was returned. This value represents 0.1 millimeters of evapotranspiration for the eight day period, so the value was divided by ten so that it could be compared to the flux tower ET measurement for that same day.

Comparing Flux Tower Data to MOD16 Data

To compare ET measured at flux towers to the 8-day estimates generated by MOD16, flux tower ET was summed up over the same 8-day period covered by MOD16. MOD16 8-day data is labelled with the Julian day that represents the start of the measurement period. Following the methods of Hu et al. (2015), each day of measurement at the flux tower was first gap-filled and then grouped into day ranges that match MOD16 coverage. If at least five of the days have all 48 LE and T measurements after gap-filling, the average value of the days was calculated and multiplied by eight and the days can be compared to MOD16.

Statistical analyses will follow those performed by Ramoelo et al. (2014). Linear regression analysis will be performed between flux tower ET and MOD16 ET to determine the coefficient of determination (R^2), which will show agreement between the variables. Such analysis will also reveal whether there is a systematic and correctable error displayed by MOD16. Accuracy of MOD16 relative to the flux towers will be assessed using root mean square error (RMSE), while bias will be used to determine whether MOD16 is over- or underestimating ET relative to the flux towers. Equations used to calculate bias, RMSE, and percent bias (PBIAS) are as follows:

$$\text{Bias}=\frac{\sum(\text{MET-FET})}{\text{N}} \qquad (8)$$

$$\text{RMSE}=\sqrt{\frac{\sum(\text{FET-MET})^2}{\text{N}}} \qquad (9)$$

$$PBIAS=\frac{Bias}{(\frac{1}{N})\sum FET}\times 100 \qquad (10)$$

where FET represents ET measured at flux towers, MET represents MOD16 ET estimatations, and N represents the number of samples considered. Such analyses were performed on the entirety of data analyzed for each tower, which are limited by the tower's collection range and the available range of MOD16 products (2000-2014).

Error Analysis

The purpose of this study was to evaluate the error in the MOD16 ET estimations. This analysis was conducted by comparing MOD16 results to flux tower data, which are the only continuous, direct measurements of ET in Canada's boreal forests. Therefore, error analysis consisted of evaluating both the error in the flux tower measurements of ET and the difference between flux tower ET and MOD16 ET values at the selected sites.

Eddy Covariance Flux Tower Error Analysis

When analyzing ET via the eddy covariance method, sources of error include missing data, instrumentation malfunction and imprecision, sampling methods, and natural variability. Researchers have examined the calibration and design of radiometers, and comparison of calibrated sensors at the same site show small differences due to sensor type (Allen et al., 2011). Modern fast response radiometers compared well with one another. Measurements of wind velocities with sonic anemometers, temperature, and water vapor have been improved with high resolution instrumentation (Wilson et al., 2002). Therefore, sites that were selected for study are those affixed with modern fast-response instrumentation.

Flux tower data can have systematic errors as a result of random error. The methodology for determining the random error associated with flux tower measurements of ET was adapted from Richardson et al. (2006). Each measurement of LE on a given day is considered, and measurements of LE data taken at the same time on both the day before and the day after are determined and can then be compared to the LE value on the day in question if certain environmental conditions are similar enough. The requirements for similar environmental conditions are as follows: mean half-hourly photosynthetic photon flux density within 75 µmol m^{-2} s^{-1}, mean half-hourly air temperature within 3 ^{o}C, and mean half-hourly windspeed within 1 m s^{-1}. If all these requirements were fulfilled, LE values were compared and a difference between ET values was determined. It is necessary to ensure these environmental conditions are similar because it lessens the likelihood that difference in flux measurements on adjacent days would be the result of different weather conditions (Richardson et al., 2006). Random error for an ET measurement pair was then determined following equation 11:

$$\delta = \frac{\sigma(x_1 - x_2)}{\sqrt{2}} \qquad (11)$$

where δ is the random error, x_1 is the ET measurement on the target day, and x_2 is the ET measurement on the adjacent day. Random error is determined for each half hourly measurement of ET that has a measurement pair value, and then random errors are summed up over the course of day.

Additionally, the gap-filling process for LE data collected at the flux towers creates uncertainty. To determine the magnitude of this uncertainty, artificial datasets were created for each day in the study period where all 48 half-hourly measurements of LE existed. For each "perfect" day analyzed, five artificial datasets with evenly spaced gaps were created, with gap proportions set at 12.5%, 25%, 50%, 75%, and 87.5% of the total daily data. Then, the gaps were filled following the previously discussed methods from Hu et al. (2015), and the percent error between the artificial gap-filled data and the true data for the day in question was determined. Comparisons were then analyzed via linear regression to determine a line-of-best-fit relationship between the percentage of data that is gap-filled and the percentage error. This method of creating artificial datasets and determining error relative to the true dataset follows work done by Falge et al. (2001). Gap-filling error was determined for each day by determining what percentage of the values for the day are gaps that were filled, and then comparing that value to the linear-regression relationship that exists between the percent of gaps filled and percent error.

Because gap-filling error is determined separately and based on different parameters than random error, they are considered independent and are summed to determine total error. For each 8-day period, flux tower ET measurement uncertainty is the sum of two variables: gap-filling error in mm of ET for each day in the 8-day period, and the sum of random errors measured for each day in the 8-day period.

Python Code

All of the methods discussed above are executed using code developed in Python 2.7, which is available at https://github.com/devinsimmons/Senior_Thesis.

Results

Analyses were performed at each flux tower to determine ET via eddy covariance, error in flux tower ET via random error and gap-filling error, and MOD16 ET for the years during which each site was active and MOD16 data was available. Using this data, statistics on MOD16 accuracy were determined. Linear regression for each individual site is shown in figure 12 of the appendix. The range of values for R^2, bias, percent bias, and root mean square error for the study towers is shown below in table 2. Linear regression graphs for each year in the study period can be found in figure 10 in the appendix.

Tower	Bias	Pbias	RMSE	R^2 of regression
CA-Gro	1.40	14.93	3.12	0.89
CA-Qfo	3.02	48.15	4.01	0.88
CA-Na1	0.64	5.29	4.40	0.77
CA-Qcu	1.00	12.08	3.09	0.87
CA-Oas	2.82	36.42	4.27	0.88
CA-SJ3	3.77	74.02	4.82	0.88
CA-Man	1.85	27.63	3.30	0.84
CA-Ojp	2.07	39.20	2.84	0.87

Table 2: Bias, Pbias, and RMSE at each tower site. Bias and RMSE are both in mm per 8-day period. Pbias is percent bias per 8-day period. Additionally, the R^2 value of the linear regression between MOD16 ET and flux tower ET is displayed. Western flux towers are shaded blue while eastern flux towers are not shaded.

All 8-day periods for which MOD16 estimations and flux tower measurements of ET exist were aggregated for the eastern and western regions and then the linear regression relationship between MOD16 ET and flux tower ET was plotted, as shown in figure 5. In aggregate, the western flux towers had a slightly higher slope and R^2.

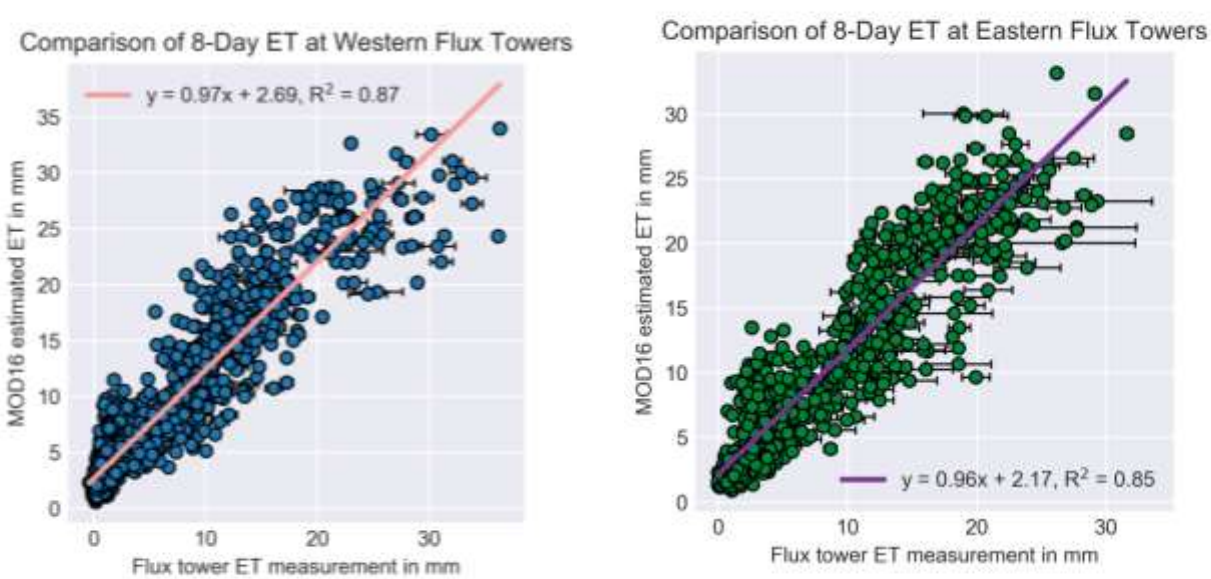


Figure 5: Linear regression of flux tower ET vs. MOD16 estimated ET for all available 8-day periods at the western and eastern flux towers, respectively.

Overall, MOD16 did show lower values for annual ET in the western sites than in the eastern sites, as shown in figure 6. These values ranged from around 340 – 525 mm per year, and these values were determined for the years during which both MOD16 and flux tower data were available. Because of the gaps that exist in the flux tower data, mean annual ET from flux towers could not be determined.

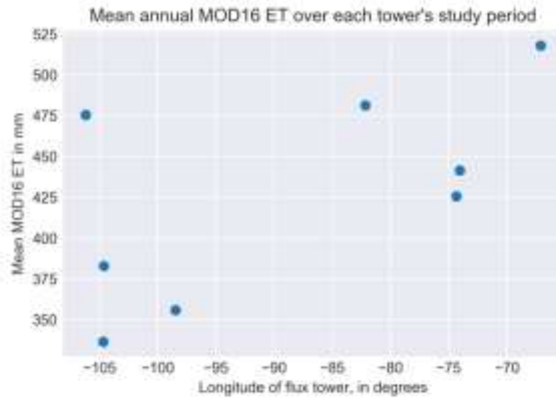


Figure 6: Annual MOD16 ET values at each tower. These values were determined by finding the annual MOD16 value at each flux tower site for the years during which both flux tower ET data and MOD16 ET data were available, then taking the mean of these annual values.

Error on the flux measurements displayed in figures 5 and 9 was calculated based on random error and gap-filling error. For each 8-day period, error generally ranged from 10% to 30%. Figure 7 displays the relationship determined between percentage of gaps filled and percent error for the CA-Qcu tower, specifically.

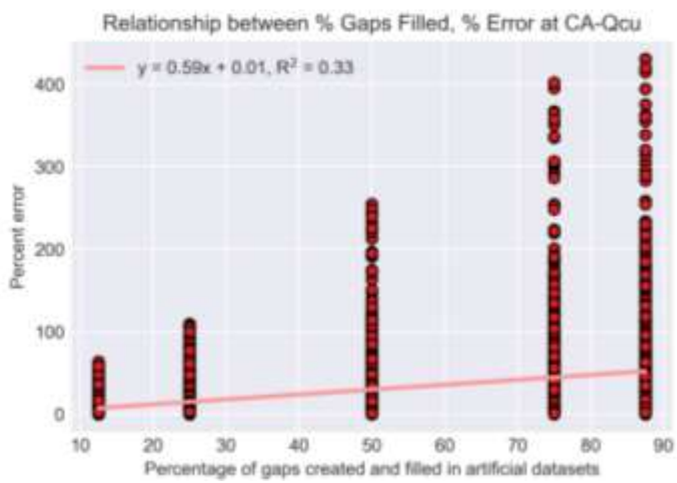
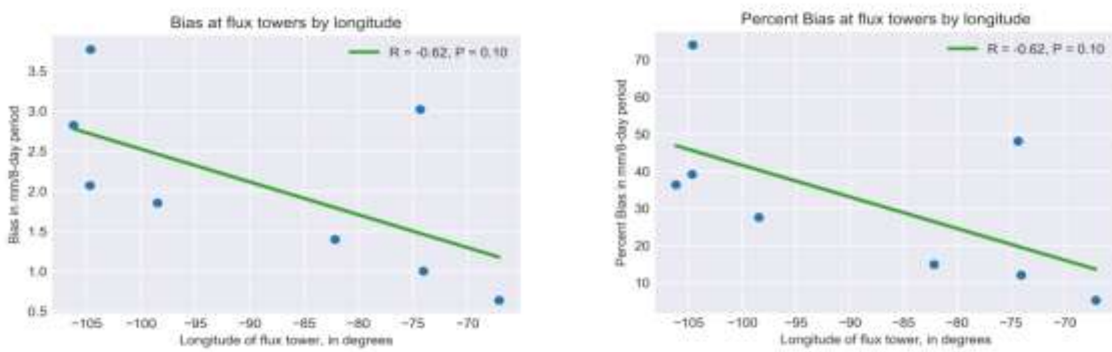


Figure 7: A graphical display of the relationship between gaps filled in data and percent error. Data points that represent error greater than 100% are generally from the winter period when ET values are quite low.

To further assess if there is a spatial variation in the accuracy of MOD16 ET estimations, bivariate correlation analysis was performed between the longitude of each flux tower site and each statistical measure of accuracy: bias, percent bias, and root mean square error. Figure 8 displays the results of this correlation analysis for the entirety of the overlapping time periods of tower measurement and MOD16 data availability for each site. With P values for all three correlations exceeding 0.05, these correlations are not significant at the 95% confidence level, although a negative correlation is observed between site longitude and both bias and percent bias.

While considering the accuracy over the entire time period did not return significant correlations with location, splitting up measurements based on seasonality returned more significant results. For each tower, 8-day periods were segregated based on the meteorological season in which they began. Meteorological seasons are defined as December, January, and February for winter; March, April, and May for spring; June, July, and August for summer; and September, October, and November for fall. When split up by season, significant negative correlations ($P < 0.05$) between tower longitude and both bias and percent bias were observed. These results are displayed in figure 10, along with results for bias and percent bias in each of the other seasons.

In addition to the analyses of accuracy and linear regression, time series graphs comparing MOD16 ET estimations with flux tower measurements were generated at each flux tower for each year that both values existed. Examples are shown below in figure 9.



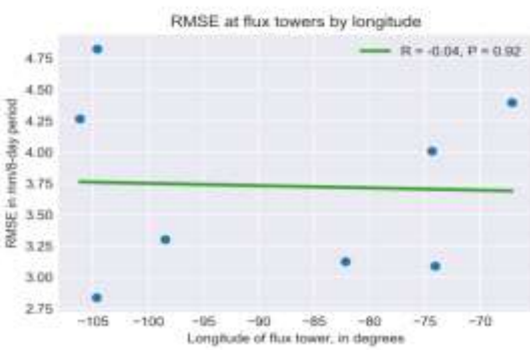


Figure 8: The results of bivariate correlation analysis between statistics of accuracy (bias, percent bias, and root mean square error) and the longitude of a flux tower site. Overall, while bias and percent bias are negatively correlated with flux tower longitude, the P values of these correlations are not significant at the 95% confidence level. There is not an observable correlation between RMSE and longitude.

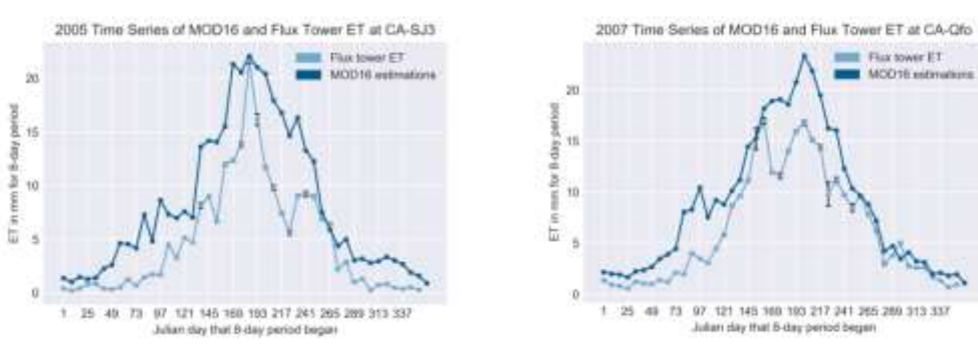


Figure 9: Annual time series at a western tower (CA-SJ3) and an eastern tower (CA-Qfo). A few patterns typical of the other time series can be observed in the ones above. MOD16 generally overestimates ET during the first 97 days, which encompasses the winter and the early spring.

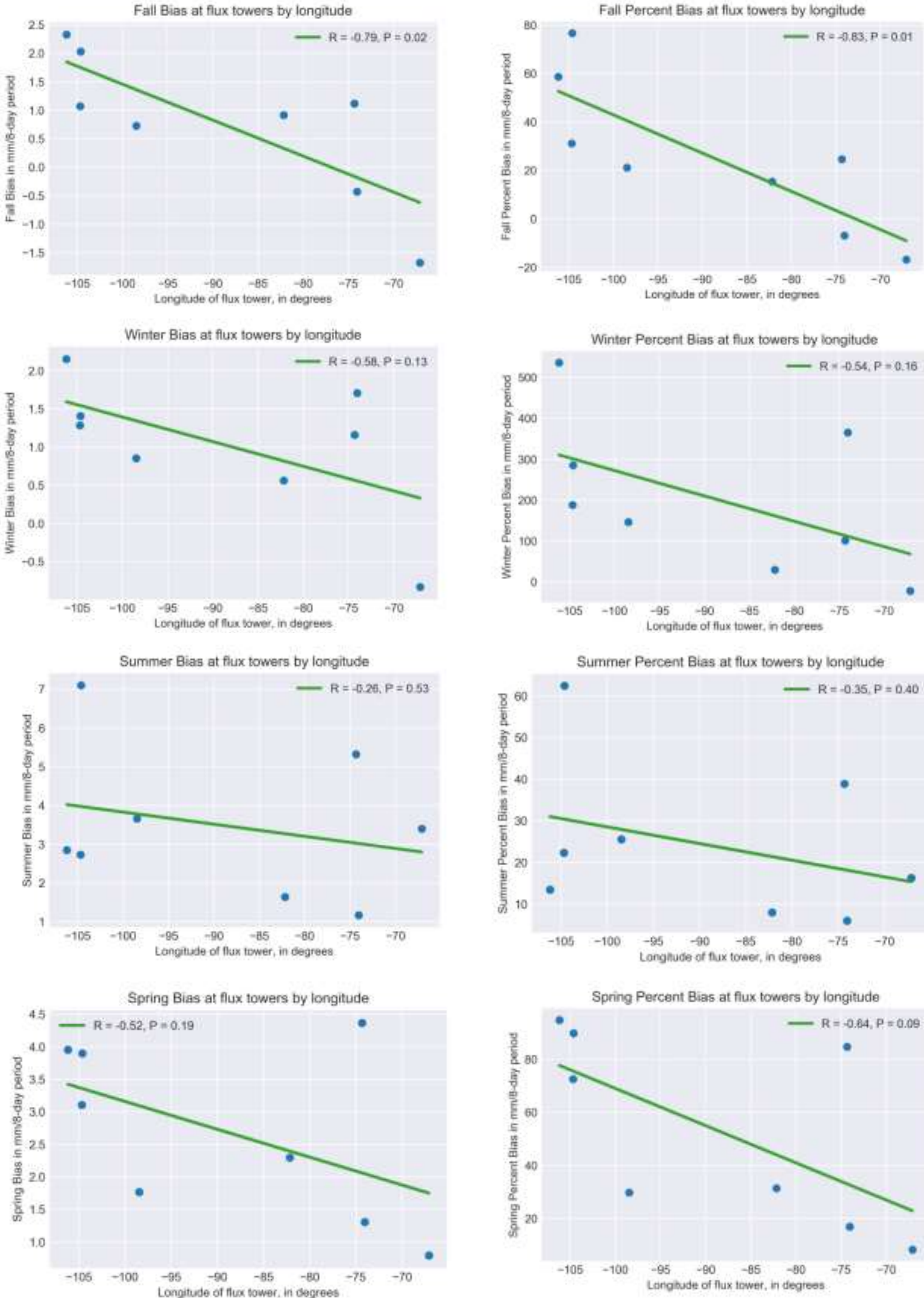


Figure 10: Seasonal correlations between bias/percent bias of MOD16 ET estimations and flux tower longitude. The correlations were significant and negative in the fall ($P < 0.05$). Correlations were generally weaker in the summer, during the peak of the growing season.

Applications

The purpose of MOD16 is to provide researchers with estimates of ET in places where measurements do not exist. I determined the 8-day ET measurements at a study location known as Horseshoe Creek in Newfoundland & Labrador. The results are shown below in figure 11.

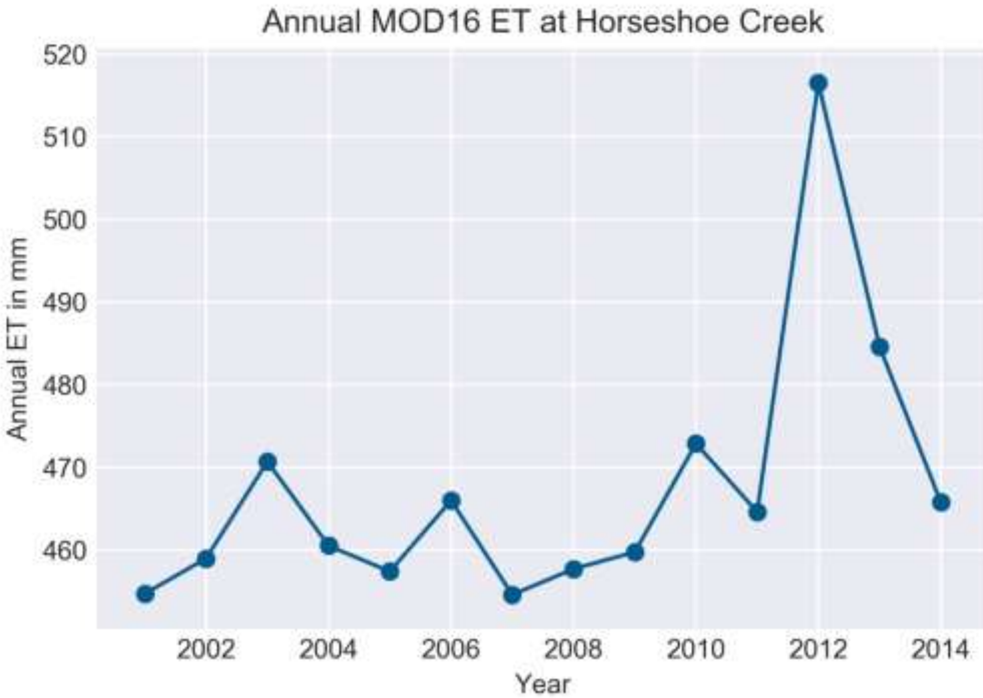


Figure 11: Annual MOD16 ET from 2001-2014 at the Horseshoe Creek site in Newfoundland & Labrador, a region that lacks any flux tower measurements.

Discussion

Linear regression between MOD16 estimations of ET and flux tower measurements at individual towers produced R^2 values between 0.77 and 0.89, suggesting good agreement. Such agreement was generally higher than that found by Ramoelo et al. (2014) in the African Savanna, where the R^2 value of the regression was 0.23. Hu et al. (2015) also analyzed forests that were classified as ENF or MF, and the R^2 values they found ranged from 0.20 to 0.96, although all but one of the R^2 values they found were at least 0.72. In general, then, the R^2 values of the regression between flux tower ET and MOD16 ET observed in this study were similar to those found in other ENF and MF sites. However, the R^2 values at the sites analyzed in this study are heavily influenced by 8-day periods that were outside the growing season, when MOD16 consistently overestimates ET when compared to the flux tower measurements. Such overestimation is especially evident in figure 10, where winter percent bias exceeds 100% at all but two of the flux tower sites. A summary of comparison between MOD16 performance in this study and other studies is displayed in table 3.

Site	Bias in mm	Pbias	RMSE in mm	R^2	MCD12 Landcover
CA-Gro	1.40	14.93	3.12	0.89	Mixed Forest
CA-Qfo	3.02	48.15	4.01	0.88	Evergreen Needleleaf Forest
CA-Na1	0.64	5.29	4.40	0.77	Mixed Forest
CA-Qcu	1.00	12.08	3.09	0.87	Mixed Forest
CA-Oas	2.82	36.42	4.27	0.88	Evergreen Needleleaf Forest
CA-SJ3	3.77	74.02	4.82	0.88	Evergreen Needleleaf Forest
CA-Man	1.85	27.63	3.30	0.84	Mixed Forest
CA-Ojp	2.07	39.2	2.84	0.87	Evergreen Needleleaf Forest
CZ-BK1	4.88	N/A	7.12	0.72	Evergreen Needleleaf Forest
DE-Tha	4.16	N/A	6.32	0.86	Evergreen Needleleaf Forest
IT-Sro	2.32	N/A	8.64	0.20	Evergreen Needleleaf Forest
RU-Fyo	2.08	N/A	2.72	0.96	Evergreen Needleleaf Forest
BE-Bra	5.12	N/A	6.88	0.88	Mixed Forest
Malopeni	1.18	21.2	3.00	0.23	Savanna
CH-Oe2	-3.12	N/A	5.76	0.81	Croplands
IT-Mbo	0.32	N/A	4.72	0.85	Grasslands
ES-Amo	-0.56	N/A	2.64	0.08	Open Shrubland
IT-Ro2	1.52	N/A	12.56	0.77	Deciduous Forest

Table 3: Summary table of MOD16 accuracy with results from this study, as well as Ramoelo et al. (2014) and Hu et al. (2015). The first eight rows are towers analyzed in this study.

RMSE analysis of MOD16 ET estimations generally did not show correlation with longitude, with R values ranging from -0.14 to 0.19 when assessed for each season. Additionally, RMSE is limited by its inability to indicate whether MOD16 is over- or underestimating ET, as its value represents the magnitude of error rather than the direction of error. Thus, the magnitude of tower accuracy does not appear to have longitudinal variation.

Seasonal underestimation of ET determined via bias and percent bias is rare but does occur at some of the eastern flux towers. At Ca-Na1, MOD16 underestimated ET in both the fall and the winter, on average. Additionally, ET was underestimated by MOD16 at Ca-Qcu in the fall. Otherwise, MOD16 overestimated at all other towers during every season, when assessed via bias and percent bias. Percent bias was generally highest in the winter, followed by spring, then fall, then summer, which had the smallest range of values across flux tower sites.

Results of the MOD16 validation performed by Mu et al. (2011) indicate that, on a global scale, MOD16 underestimates annual ET in ENFs and overestimates in MF sites. However, the only underestimations found in the present study were at MF sites, Ca-Na1 and Ca-Qcu. Again, these underestimations were only observed in specific seasons and were not present when assessed throughout the duration of available data. At all other sites during all seasons, MOD16 was found to overestimate ET on average over 8-day periods. MOD16 overestimated ET at all ENF sites, which may indicate that MOD16 accuracy in ENF boreal sites is much different than in ENF non-boreal sites.

In their study of flux tower sites across Europe, Hu et al. (2015) found that MOD16 underestimated ET in semi-arid sites in Portugal and Spain. They contend that this may be a result of MOD16 using vapor pressure deficit (VPD) to determine canopy resistance rather than root-zone soil moisture, which they argue would lead to underestimations of canopy transpiration in semi-arid regions. While ET at the more arid, western flux tower sites of this study was not underestimated by MOD16, such findings have implications for regions that are experiencing high evaporative demand, especially as evaporative demand is higher in the western boreal than the eastern boreal (D'Orangeville et al., 2016).

A similar study carried out by Wang et al. (2015) studied MOD16 over Canada and also found that ET was overestimated in the winter at boreal forest sites. They discuss how much of the ET that does occur during the winter results from snow sublimation or soil evaporation, as the forests are dormant and unable to transpire water. Inaccuracy in the winter can also be compounded by the MOD16 algorithm treating snow as bare soil, which is problematic due to the winter precipitation that occurs in the Canadian boreal forest. Similar to the present study, Wang et al. (2015) compared monthly ET at 14 flux tower sites in mm with monthly ET from MOD16 in mm via linear regression. While my analyses were performed on 8-day periods rather than a monthly scale, their results showed a lower R^2 value (0.73), higher intercept (10.64), and shallower slope (0.79) than both the analysis of eastern boreal towers and the analysis of western boreal towers. Their study was performed across a variety of biomes, which may indicate that MOD16 is more accurate in Canada for the boreal forest than other biomes, such as tundra or deciduous forest.

Estimates of flux tower error varied for each tower, largely based on the presence of gaps in measurement. Among all 8-day periods, the majority (1410 out of 1758) had less than 10% error in flux tower measurements, which includes calculations of both gap filling error and random error. In the winter months, however, error could reach above 100%, as it did during nine different 8-day periods. Two of the towers that had the highest error, i.e., had the most missing data, were CA-Qcu and CA-Oas. Missing measurements can result from stormy conditions or lack of wind movement (Ramoelo et al., 2014).

Contrary to the alternative hypothesis, there is not a significant correlation between longitude of a flux tower location and any of the tested statistical measures of MOD16 accuracy. However, there are still negative correlations between MOD16 bias/percent bias and longitude when assessed over multi-year temporal scales. Additionally, analysis of individual seasons showed that there is a significant negative correlation between MOD16 bias/percent bias and longitude in the fall. Further research may focus on validation of other MODIS products that go in to MOD16, including albedo, leaf area index, land cover, and meteorological data. Such insights may shed light into why MOD16 overestimates ET stronger in the western boreal during the fall season.

Conclusion

To gain insight into how the boreal forest responds to warming climate, a better understanding of the water balance is required. While much of the Canadian boreal lacks direct measurements of ET, MOD16 offers an estimate of ET throughout the entire world. These products require validation and a determination of accuracy. Results comparing ET measured at eight flux towers across the Canadian boreal forest with the MOD16 ET estimation product indicates that MOD16 generally overestimates ET at all sites when evaluated throughout the year. Meanwhile, seasonal analysis has shown that MOD16 overestimation is strongest in the winter and that accuracy, quantified as bias and percent bias, is significantly negatively correlated with the longitude of a flux tower. This indicates that, in the western boreal, MOD16 is overestimating ET to a higher degree than the eastern boreal during the fall. Such findings are important for the use of MOD16 estimates to determine how the water balance is changing across the Canadian boreal, as these estimates likely require a correction to be useful. Further research is needed to determine what factors on the ground are causing MOD16 to overestimate ET stronger in the west.

Honor Code: I pledge on my honor that I have not given or received any unauthorized

assistance on this assignment.

Date: 4/25/2019

Bibliography

Allen, R, L. Pereira, T. Howell, and M. Jensen. 2011. "Evapotranspiration information reporting: I. Factors governing measurement accuracy." *Agricultural Water Management* 98 (6): 899-920. doi: 10.1016/j.agwat.2010.12.015.

Amiro, B., Barr, A., Black, T., Iwashita, H., Kljun, N., McCaughey, J., Morgenstern, K., Murayama, S., Nesic, Z., Orchansky, A., and Saigusa, N. 2006. "Carbon, energy and water fluxes at mature and disturbed forest sites, Saskatchewan, Canada." *Agricultural and Forest Meteorology* 136 (3-4): 237-251. doi: 10.1016/j.agrformet.2004.11.012.

Baldocchi, D., E. Falge, L. Gu, R. Olsen, D. Hollinger, S. Running, P. Anthoni, et al. 2001. "FLUXNET: A New Tool to Study the Temporal and Spatial Variability of Ecosystem-Scale Carbon Dioxide, Water Vapor, and Energy Flux Densities." *Bulletin of the American Meteorological Society* 82 (11): 2415-2434. doi: 10.1175/1520-0477(2001)082<2415:FANTTS>2.3.CO;2.

Bergeron, O., H. Margolis, T. Black, C. Coursolle, A. Dunne, A. Barr, and S. Wofsy. 2007. "Comparison of carbon dioxide fluxes over three boreal black spruce forests in Canada." *Global Change Biology* 13: 89-107. doi: 10.1111/j.1365-2486.2006.01281.x

Channan, S., K. Collins, and W. Emanuel. 2014. "Global mosaics of the standard MODIS land cover type data." *University of Maryland and the Pacific Northwest National Laboratory, College Park, Maryland, USA* 30.

Cleugh, H., R. Leuning, Q. Mu, and S. Running. 2007. "Regional evaporation estimates from flux tower and MODIS satellite data." *Remote Sensing of Environment* 103 (3): 285-304. doi: 10.1016/j.rse.2006.07.007

D'Orangeville, L., L. Duchesne, D. Houle, D. Kneeshaw, B. Cote, and N. Pederson. 2016. "Northeastern North America as a potential refugium for boreal forests in a warming climate." *Science* 352 (6292): 1452-1455. doi: 10.1126/science.aaf4951.

Falge, E., D. Baldocchi, R. Olson, P. Anthoni, M. Aubinet, C. Bernhofer, G. Burba, et al. 2001. "Gap filling strategies for defensible annual sums of net ecosystem exchange." *Agricultural and Forest Meteorology* 107 (1): 43-69. doi: 10.1016/S0168-1923(00)00225-2.3

Giasson, M., C. Coursolle, and H. Margolis. 2006. "Ecosystem-level CO_2 fluxes from a boreal cutover in eastern Canada before and after scarification." *Agricultural and Forest Meteorology* 140 (1-4): 23-40. doi: 10.1016/j.agrformet.2006.08.001.

Griffis, T., Black, T., Gaumont-Guay, D., Drewitt, B., Nesic, Z., Barr, A., Morgenstern, K., and Kljun, N. 2004. "Seasonal variation and partitioning of ecosystem respiration in a southern boreal aspen forest." *Agricultural and Forest Meteorology* 125(3-4): 207-223. doi: 10.1016/j.agrformet.2004.04.006.

Griffis, T., Black, T., Morgenstern, K., Barr, A., Nesic, Z., Drewitt, G., Gaumont-Guay, D., and McCaughey, J. 2003. "Ecophysiological controls on the carbon balances of three southern boreal forests" *Agricultural and Forest Meteorology* 117(1-2): 53-71. doi: 10.1016/S0168-1923(03)00023-6.

Hu, G., L. Jia, and M. Menenti. 2015. "Comparison of MOD16 and LSA-SAF MSG evapotranspiration products over Europe for 2011." *Remote Sensing of Environment* 156: 510-426. doi: 10.1016/j.rse.2014.10.017.

Kiehl, J. and K. Trenberth. 1997. "Earth's Annual Global Mean Energy Budget." *Bulletin of the American Meteorological Society* 78 (2): 197-208. doi: 10.1175/1520-0477(1997)078<0197:EAGMEB>2.0.CO;2.

Lloyd, A. and A. Bunn. 2007. "Responses of the circumpolar boreal forest to 20th century climate variability." *Environmental Research Letters* 2 (4): 045013. doi: 10.1088/1748-9326/2/4/045013.

McCaughey, J., Pejam, M., Arain, M., and Cameron, D. 2006. "Carbon dioxide and energy fluxes from a boreal mixedwood forest ecosystem in Ontario, Canada." *Agricultural and Forest Meteorology* 140 (1-4): 79-96. doi: 10.1016/j.agrformet.2006.08.010.

Monteith, J. 1965. "Evaporation and environment." *Symposium of the society of experimental biology* 19: 205-224.

Mu, Q., F. Heinsch, M. Zhao, and S. Running. 2007. "Development of a global evapotranspiration algorithm based on MODIS and global meteorology data." *Remote Sensing of Environment*, 111 (4): 519-536. doi: 10.1016/j.rse.2007.04.015

Mu, Q., M. Zhao, and S. Running. 2011. "Improvements to a MODIS global terrestrial evapotranspiration algorithm." *Remote Sensing of Environment*, 115 (8): 1781 – 1800. doi: 10.1016/j.rse.2011.02.019.

Pan, Y., R. Birdsey, J. Fang, R. Houghton, P. Kauppi, W. Kurz, O. Phillips, et al. 2011. "A Large and Persistent Carbon Sink in the World's Forests." *Science* 333 (6045): 988-993. doi: 10.1126/science.1201609.

Ramoelo, A., N. Majozi, R. Mathieu, N. Jovanovic, A. Nickless, and S. Dzikiti. 2014. "Validation of Global Evapotranspiration Product (MOD16) using Flux Tower Data in the African Savanna, South Africa." *Remote Sensing* 6 (8): 7406-7423. doi: 10.3390/rs6087406.

Richardson, A., Hollinger, D., Burba, G., Davis, K., Flanagan, L., Katul, G., Munger, J., Ricciuto, D., Stoy, P., Suyker, A., Verma, S., and Wofsy, S. 2006. "A multi-site analysis of random error in tower-based measurements of carbon and energy fluxes." *Agricultural and Forest Meteorology* 136 (1-2): 1-18. doi: 10.1016/j.agrformet.2006.01.007.

Running, S., Q. Mu, M. Zhao, and A. Moreno. 2017. "User's Guide MODIS Global Terrestrial Evapotranspiration (ET) Product (NASA MOD16A2/A3) NASA Earth Observing System MODIS Land Algorithm." *United States Geologic Survey.*

Sevanto, S., T. Suni, J. Pumpanen, T. Gronholm, P. Kolari, E. Nikinmaa, P. Hari, et al. 2006. "Wintertime photosynthesis and water uptake in a boreal forest." *Tree Physiology* 26 (6): 749-757.

Tang, R., K. Shao, Z. Li, H. Wu, B. Tang, G. Zhou, and L. Zhang. 2015. "Multiscale Validation of the 8-day MOD16 Evapotranspiration Product Using Flux Data Collected in China." *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 8 (4): 1478-1486. doi: 10.1109/JSTARS.2015.2420105.

Twine, T., W. Kustas, J. Norman, D. Cook, P. Houser, T. Meyers, J. Prueger, et al. 2000. "Correcting eddy-covariance flux underestimates over a grassland" *Agricultural and Forest Meteorology* 103 (3): 279-300. doi: 10.1016/S0168-1923(00)00123-4.

Wang, S., M. Pan, Q. Mu, X. Shi, J. Mao, C. Brummer, R. Jassal, et al. 2015. "Comparing Evapotranspiration from Eddy Covariance Measurements, Water Budgets, Remote Sensing, and Land Surface Models over Canada." *Journal of Hydrometeorology* 16 (): 1540-1560. doi: 10.1175/JHM-D-14-0189.1.

Wilson, K., P. Hanson, P. Mulholland, D. Baldocchi, and S. Wullschlerger. 2002. "Energy balance closure at FLUXNET sites." *Agricultural and Forest Meteorology* 13 (1 – 4): 223-243. doi: 10.1016/S0168-1923(02)00109-0.

Xing, Z., Bourque, C., Swift, D., Clowater, C., Krasowski, M., and Meng, F. 2005. "Carbon and biomass partitioning in balsam fir (Abies balsamea)." *Tree Physiology.* 25 (9): 1207-1217.

Appendix

Tower Name	8-day period	MOD16 estimated	Flux Tower Measured ET in	Measurement Uncertainty as a	Days of Flux Tower

	start date (Julian)	ET in mm	mm	Percentage	Measurement in 8 day period
CA-Man	2003001	1.59	0.39	3.48%	5
CA-Man	2003009	1.34	0.55	4.21%	8
CA-Man	2003017	1.14	0.27	3.68%	8
CA-Man	2003025	1.06	0.40	8.65%	8
CA-Man	2003033	1.08	1.09	8.95%	7
CA-Man	2003041	1.09	0.54	1.78%	8
CA-Man	2003049	1.19	0.59	9.54%	8
CA-Man	2003057	1.28	0.68	7.24%	8
CA-Man	2003065	2.06	0.75	6.23%	8
CA-Man	2003073	5.24			1
CA-Man	2003081	5.31			0
CA-Man	2003089	4.99			0
CA-Man	2003097	7.81			0
CA-Man	2003105	8.17			3
CA-Man	2003113	5.54	6.25	3.71%	8
CA-Man	2003121	8.24	9.27	4.08%	7
CA-Man	2003129	10.75	16.08	4.68%	8
CA-Man	2003137	10.24	13.38	6.99%	8
CA-Man	2003145	15.77	15.07	5.13%	8
CA-Man	2003153	15.17	13.19	7.28%	8
CA-Man	2003161	17.21	15.20	4.96%	7
CA-Man	2003169	19.32	14.68	4.59%	7
CA-Man	2003177	21.5			0
CA-Man	2003185	20.96			3
CA-Man	2003193	21.84	17.05	6.11%	8
CA-Man	2003201	22.8	19.50	4.60%	8
CA-Man	2003209	20.39	15.58	4.97%	6
CA-Man	2003217	20.3	13.94	10.90%	8
CA-Man	2003225	16.19	14.45	2.68%	8
CA-Man	2003233	16.48	11.52	4.65%	8
CA-Man	2003241	12.24	9.63	5.41%	8
CA-Man	2003249	10.28	8.89	5.47%	8
CA-Man	2003257	5.93	5.01	6.36%	8
CA-Man	2003265	5.72	5.12	3.96%	8
CA-Man	2003273	4.23	3.41	5.59%	8
CA-Man	2003281	4.75	3.12	5.17%	8
CA-Man	2003289	3.11	1.56	8.56%	8
CA-Man	2003297	2.5	1.78	3.57%	8
CA-Man	2003305	1.71	1.33	18.75%	8
CA-Man	2003313	1.85	0.68	5.40%	8
CA-Man	2003321	1.73	0.52	17.91%	8
CA-Man	2003329	1.64	0.46	9.15%	8

CA-Man	2003337	1.38	0.42	10.20%	8
CA-Man	2003345	1.25			4
CA-Man	2003353	1.65	0.52	8.81%	8
CA-Man	2003361	0.71			0
CA-Man	2004001	0.94			4
CA-Man	2004009	1.11	0.55	14.24%	5
CA-Man	2004017	0.98	0.05	76.99%	8
CA-Man	2004025	0.98			4
CA-Man	2004033	1.76			0
CA-Man	2004041	1.33			2
CA-Man	2004049	1.78	1.39	7.59%	7
CA-Man	2004057	2.45			0
CA-Man	2004065	3.06	2.16	7.06%	6
CA-Man	2004073	3.26	1.47	12.62%	8
CA-Man	2004081	3.78			3
CA-Man	2004089	9.32	3.74	8.41%	8
CA-Man	2004097	6.27	4.70	2.86%	7
CA-Man	2004105	6.87	4.03	4.56%	8
CA-Man	2004113	8.41	4.05	8.46%	8
CA-Man	2004121	6.71	4.78	7.11%	8
CA-Man	2004129	9.77	6.17	7.28%	8
CA-Man	2004137	7.78	11.25	7.00%	8
CA-Man	2004145	8.4	12.09	6.08%	8
CA-Man	2004153	11.16	8.98	8.21%	8
CA-Man	2004161	12.14	10.46	6.32%	8
CA-Man	2004169	11.11			4
CA-Man	2004177	18.78	11.05	4.33%	6
CA-Man	2004185	20.97	11.95	6.08%	6
CA-Man	2004193	24.03	14.30	4.85%	8
CA-Man	2004201	22.56	13.01	2.69%	8
CA-Man	2004209	16.59	8.08	9.07%	8
CA-Man	2004217	18.01	12.13	3.58%	8
CA-Man	2004225	14.07	11.48	3.73%	8
CA-Man	2004233	13.25	9.42	6.02%	8
CA-Man	2004241	10.22	7.30	4.25%	8
CA-Man	2004249	6.33			3
CA-Man	2004257	6.36	4.94	6.61%	8
CA-Man	2004265	5.4	8.83	3.95%	8
CA-Man	2004273	4.29	3.87	11.27%	8
CA-Man	2004281	4.37	4.40	6.10%	8
CA-Man	2004289	3.6	2.16	6.36%	8
CA-Man	2004297	2.31	1.71	5.68%	8
CA-Man	2004305	2.4	1.46	10.30%	8
CA-Man	2004313	3.18	0.70	12.53%	8

CA-Man	2004321	1.6			4
CA-Man	2004329	1.39			0
CA-Man	2004337	1.08			0
CA-Man	2004345	1.3			4
CA-Man	2004353	0.6	0.14	7.47%	5
CA-Man	2004361	0.83			0
CA-Man	2005001	1.31	0.24	15.86%	8
CA-Man	2005009	0.91	0.05	31.24%	7
CA-Man	2005017	1.29	0.15	9.30%	8
CA-Man	2005025	1.77			4
CA-Man	2005033	1.52			0
CA-Man	2005041	1.84	0.75	5.78%	8
CA-Man	2005049	1.86	0.97	12.65%	8
CA-Man	2005057	2.9	1.44	6.47%	7
CA-Man	2005065	2.75	2.09	4.40%	8
CA-Man	2005073	3.96			3
CA-Man	2005081	5.39	2.28	5.15%	8
CA-Man	2005089	9.4	4.31	5.72%	8
CA-Man	2005097	9.98	4.57	14.45%	8
CA-Man	2005105	8.32	7.31	6.26%	8
CA-Man	2005113	6.81	7.22	7.11%	8
CA-Man	2005121	8.81	7.52	2.59%	8
CA-Man	2005129	7.09	7.68	5.43%	8
CA-Man	2005137	11.84	7.10	2.23%	8
CA-Man	2005145	12.81	7.60	7.26%	7
CA-Man	2005153	11.84	10.02	6.25%	7
CA-Man	2005161	20.5	14.65	2.56%	8
CA-Man	2005169	18.95	14.82	6.14%	8
CA-Man	2005177	23.86	21.14	7.92%	6
CA-Man	2005185	25.5	25.47	3.99%	8
CA-Man	2005193	23.67	22.72	7.92%	7
CA-Man	2005201	19.38	25.36	8.77%	6
CA-Man	2005209	20.35			2
CA-Man	2005217	17.42	10.95	3.46%	6
CA-Man	2005225	12.94			0
CA-Man	2005233	12.24	8.66	5.90%	8
CA-Man	2005241	10.41	9.28	3.62%	8
CA-Man	2005249	7.43	9.38	9.56%	8
CA-Man	2005257	6.38	8.58	6.85%	8
CA-Man	2005265	5.16	4.43	5.26%	8
CA-Man	2005273	4.38	2.84	16.58%	8
CA-Man	2005281	3.17	0.72	11.89%	8
CA-Man	2005289	3.69	0.75	4.25%	8
CA-Man	2005297	2.93	0.62	12.50%	8

CA-Man	2005305	2.78	1.10	4.91%	8
CA-Man	2005313	3.34	1.33	5.36%	8
CA-Man	2005321	2.48	0.43	16.40%	7
CA-Man	2005329	2.64			0
CA-Man	2005337	2.05			0
CA-Man	2005345	1.53			2
CA-Man	2005353	1.71			1
CA-Man	2005361	1.1			0
CA-Man	2006001	1.6			1
CA-Man	2006009	1.5			3
CA-Man	2006017	1.5			2
CA-Man	2006025	1.82			4
CA-Man	2006033	2.03			0
CA-Man	2006041	1.52			4
CA-Man	2006049	2.09	0.68	7.66%	8
CA-Man	2006057	2.21	0.90	8.72%	8
CA-Man	2006065	3.2	0.78	5.06%	8
CA-Man	2006073	4.85			4
CA-Man	2006081	8.18	1.57	5.75%	8
CA-Man	2006089	5.82	2.89	4.25%	8
CA-Man	2006097	8.26	1.85	9.55%	8
CA-Man	2006105	8.51	7.42	3.88%	5
CA-Man	2006113	6.63	10.82	3.59%	7
CA-Man	2006121	9.33	8.64	3.91%	5
CA-Man	2006129	9.89	10.58	7.80%	7
CA-Man	2006137	11.06	13.75	6.62%	8
CA-Man	2006145	12.85	12.53	5.92%	8
CA-Man	2006153	14.98			4
CA-Man	2006161	18.8			1
CA-Man	2006169	22.44	19.61	3.42%	8
CA-Man	2006177	28.64	20.13	3.76%	8
CA-Man	2006185	20.78	13.73	6.24%	8
CA-Man	2006193	23.16			0
CA-Man	2006201	20.95			2
CA-Man	2006209	18.9	19.09	3.33%	8
CA-Man	2006217	18.95	16.62	3.77%	8
CA-Man	2006225	17.33	18.36	3.81%	8
CA-Man	2006233	14.33			1
CA-Man	2006241	12.52			0
CA-Man	2006249	9.03			1
CA-Man	2006257	5.65	6.53	4.72%	8
CA-Man	2006265	5.06	7.32	7.14%	8
CA-Man	2006273	5.19	5.72	2.80%	8
CA-Man	2006281	3.7	6.66	7.41%	7

CA-Man	2006289	4.48	1.89	5.48%	7
CA-Man	2006297	4.05			0
CA-Man	2006305	3.8	1.78	6.69%	6
CA-Man	2006313	1.94			4
CA-Man	2006321	1.61	1.30	13.73%	7
CA-Man	2006329	1.35			4
CA-Man	2006337	1.43			4
CA-Man	2006345	1.4			0
CA-Man	2006353	1.75	0.79	9.64%	5
CA-Man	2006361	1.05			0
CA-Man	2007001	1.61	0.30	15.01%	6
CA-Man	2007009	0.85			4
CA-Man	2007017	1.27	0.44	4.65%	5
CA-Man	2007025	1.43			0
CA-Man	2007033	1.12			0
CA-Man	2007041	1.26			0
CA-Man	2007049	1.71			0
CA-Man	2007057	2.37			0
CA-Man	2007065	2.76			0
CA-Man	2007073	2.86			0
CA-Man	2007081	5.99	2.34	5.68%	7
CA-Man	2007089	4.6	2.24	2.19%	8
CA-Man	2007097	10.1	1.64	2.94%	8
CA-Man	2007105	9.03	3.06	1.44%	8
CA-Man	2007113	7.2			2
CA-Man	2007121	10.67			0
CA-Man	2007129	10.45			0
CA-Man	2007137	8.63			0
CA-Man	2007145	11.09			0
CA-Man	2007153	12.09			0
CA-Man	2007161	18.38			0
CA-Man	2007169	16.87			0
CA-Man	2007177	17.98			0
CA-Man	2007185	18.4			0
CA-Man	2007193	23.18			0
CA-Man	2007201	19.87			0
CA-Man	2007209	19.6	15.58	9.93%	7
CA-Man	2007217	18.9	13.37	7.03%	8
CA-Man	2007225	14.6			0
CA-Man	2007233	12.94			0
CA-Man	2007241	11.26			0
CA-Man	2007249	6.68			0
CA-Man	2007257	5.7			0
CA-Man	2007265	5.93	6.34	3.03%	8

CA-Man	2007273	4.88	5.69	5.05%	5
CA-Man	2007281	3.44	2.75	5.47%	8
CA-Man	2007289	3.25	2.32	8.32%	8
CA-Man	2007297	3.85	4.13	3.34%	8
CA-Man	2007305	2.35			3
CA-Man	2007313	1.97			0
CA-Man	2007321	1.61	1.16	6.79%	5
CA-Man	2007329	1.15			0
CA-Man	2007337	1.37			0
CA-Man	2007345	1.25			0
CA-Man	2007353	1.44			0
CA-Man	2007361	0.98			0
CA-Man	2008001	1.56			0
CA-Man	2008009	1.22			0
CA-Man	2008017	1.04			3
CA-Man	2008025	1.3	0.21	10.79%	8
CA-Man	2008033	1.17	1.26	12.29%	7
CA-Man	2008041	1.21			3
CA-Man	2008049	1.93			0
CA-Man	2008057	1.87			3
CA-Man	2008065	2.68	2.21	8.42%	8
CA-Man	2008073	3.9	2.46	4.25%	8
CA-Man	2008081	4.62	2.25	3.37%	8
CA-Man	2008089	6.36	2.70	5.85%	8
CA-Man	2008097	9.27	2.71	4.88%	8
CA-Man	2008105	10.05			2
CA-Man	2008113	6.03	3.94	4.02%	8
CA-Man	2008121	7.09			3
CA-Man	2008129	8.86			2
CA-Man	2008137	9.33	8.96	4.49%	8
CA-Man	2008145	9.26			1
CA-Man	2008153	10.72	13.39	0.99%	8
CA-Man	2008161	15.03	10.41	1.94%	8
CA-Man	2008169	18.58			3
CA-Man	2008177	19.31			0
CA-Man	2008185	17.46			0
CA-Man	2008193	20.49			2
CA-Man	2008201	23.34	18.47	5.23%	8
CA-Man	2008209	20.37	12.26	2.51%	8
CA-Man	2008217	20.42	17.36	1.64%	8
CA-Man	2008225	18.18	15.66	3.31%	8
CA-Man	2008233	14.67	13.33	2.15%	8
CA-Man	2008241	10.27	10.57	1.08%	8
CA-Man	2008249	8.22	6.49	1.61%	8

CA-Man	2008257	5.36	4.82	0.91%	8
CA-Man	2008265	5.44	4.40	2.86%	8
CA-Man	2008273	4.4	2.58	3.49%	8
CA-Man	2008281	3.25	1.48	5.52%	8
CA-Man	2008289	3.93	1.81	1.63%	5
CA-Man	2008297	3.84			0
CA-Man	2008305	3.31			4
CA-Man	2008313	3.05			1
CA-Man	2008321	2.03			3
CA-Man	2008329	1.74			0
CA-Man	2008337	1.32			0
CA-Man	2008345	0.76			0
CA-Man	2008353	0.84			0
CA-Man	2008361	0.91			0
CA-OAS	2000001	1.78	-0.05	103.82%	8
CA-OAS	2000009	1.38	0.31	13.88%	8
CA-OAS	2000017	1.61	0.38	13.31%	7
CA-OAS	2000025	1.83	-0.20	13.45%	8
CA-OAS	2000033	2.4	0.21	23.45%	8
CA-OAS	2000041	1.89	0.06	81.53%	8
CA-OAS	2000049	3.83	0.80	8.23%	8
CA-OAS	2000057	5.76	1.20	5.51%	8
CA-OAS	2000065	5.98	1.52	2.23%	8
CA-OAS	2000073	7.16	1.60	5.93%	8
CA-OAS	2000081	6.49	2.13	6.21%	8
CA-OAS	2000089	8.05	4.23	3.16%	8
CA-OAS	2000097	7.5	2.62	6.37%	8
CA-OAS	2000105	6.72	3.88	3.58%	7
CA-OAS	2000113	8.21	3.21	3.53%	8
CA-OAS	2000121	6.32	5.77	5.98%	8
CA-OAS	2000129	7.16	3.12	2.72%	8
CA-OAS	2000137	9.94	9.79	1.44%	8
CA-OAS	2000145	13.22	12.07	1.10%	8
CA-OAS	2000153	22.94	15.47	1.34%	8
CA-OAS	2000161	19.13	14.90	3.33%	8
CA-OAS	2000169	27.82	22.79	1.47%	8
CA-OAS	2000177	28.22	25.59	2.97%	8
CA-OAS	2000185	27.01	19.03	0.66%	8
CA-OAS	2000193	28.43	19.66	13.39%	8
CA-OAS	2000201	27.77	27.25	1.00%	8
CA-OAS	2000209	27.79	29.49	2.88%	8
CA-OAS	2000217	25.26	14.89	11.29%	7
CA-OAS	2000225	24.42	19.75	1.44%	8
CA-OAS	2000233	22.47	24.04	1.75%	8

CA-OAS	2000241	15.37	15.07	1.38%	8
CA-OAS	2000249	16.13	15.44	1.01%	8
CA-OAS	2000257	11.73	14.57	2.47%	8
CA-OAS	2000265	4.54	4.86	2.10%	8
CA-OAS	2000273	3.87	3.27	4.07%	8
CA-OAS	2000281	3.67	1.17	4.83%	8
CA-OAS	2000289	4.71	1.20	7.02%	8
CA-OAS	2000297	4.34	1.16	4.17%	8
CA-OAS	2000305	5.04	1.50	7.29%	8
CA-OAS	2000313	4.4	0.76	10.75%	6
CA-OAS	2000321	3.24	0.55	12.43%	7
CA-OAS	2000329	3.28			0
CA-OAS	2000337	2.7	1.06	16.37%	7
CA-OAS	2000345	1.54			0
CA-OAS	2000353	1.36	0.24	15.36%	5
CA-OAS	2000361	1.34			0
CA-OAS	2001001	2.51	0.54	12.16%	8
CA-OAS	2001009	1.85	0.05	108.13%	6
CA-OAS	2001017	2.25	-0.01	453.20%	8
CA-OAS	2001025	2.33	-0.44	4.23%	5
CA-OAS	2001033	2.76	0.82	10.89%	7
CA-OAS	2001041	2.01	0.30	8.88%	7
CA-OAS	2001049	2.59	0.24	12.21%	8
CA-OAS	2001057	4.42	0.51	8.39%	8
CA-OAS	2001065	6.41	1.82	3.77%	8
CA-OAS	2001073	5.68	1.17	5.12%	8
CA-OAS	2001081	6.21	1.46	3.46%	8
CA-OAS	2001089	6.53	1.46	5.04%	8
CA-OAS	2001097	7.33	2.93	3.37%	8
CA-OAS	2001105	4.63	3.89	1.08%	8
CA-OAS	2001113	3.7	3.97	2.95%	8
CA-OAS	2001121	4.73	4.57	21.17%	8
CA-OAS	2001129	9.58	7.99	1.50%	8
CA-OAS	2001137	20.67	14.23	2.67%	8
CA-OAS	2001145	24.52	17.27	1.64%	8
CA-OAS	2001153	27.5	21.00	0.50%	8
CA-OAS	2001161	21.49			2
CA-OAS	2001169	25.43			4
CA-OAS	2001177	25.7	20.71	1.45%	8
CA-OAS	2001185	28.97	32.26	0.75%	8
CA-OAS	2001193	27.12	21.95	0.71%	8
CA-OAS	2001201	24.31	23.01	0.41%	8
CA-OAS	2001209	20.21	28.93	1.54%	8
CA-OAS	2001217	24.64	24.49	0.83%	8

CA-OAS	2001225	23.54	22.05	1.23%	8
CA-OAS	2001233	20.12	16.91	1.43%	8
CA-OAS	2001241	22.02	14.68	8.93%	8
CA-OAS	2001249	16.27	8.90	1.30%	8
CA-OAS	2001257	14.28	8.77	1.64%	8
CA-OAS	2001265	6.09	5.49	1.65%	8
CA-OAS	2001273	3.62	3.18	1.96%	8
CA-OAS	2001281	4.14	2.23	3.55%	8
CA-OAS	2001289	4.55	1.27	4.87%	8
CA-OAS	2001297	4.9	0.36	13.95%	8
CA-OAS	2001305	4.63	1.46	4.77%	8
CA-OAS	2001313	4.61	0.30	24.89%	6
CA-OAS	2001321	5.12	0.86	17.44%	8
CA-OAS	2001329	4.1	0.62	4.99%	7
CA-OAS	2001337	3.44	0.05	123.20%	7
CA-OAS	2001345	3.19	0.11	48.08%	8
CA-OAS	2001353	2.25	-0.26	26.94%	8
CA-OAS	2001361	1.24			0
CA-OAS	2002001	2.26	-0.14	45.03%	6
CA-OAS	2002009	2.52	0.56	9.49%	8
CA-OAS	2002017	1.63	0.35	6.66%	8
CA-OAS	2002025	1.37	0.12	9.82%	6
CA-OAS	2002033	2.43	0.29	15.99%	8
CA-OAS	2002041	4.19	0.94	6.41%	8
CA-OAS	2002049	4.63	0.87	4.64%	8
CA-OAS	2002057	3.7	0.63	3.78%	8
CA-OAS	2002065	4.8	0.80	6.77%	8
CA-OAS	2002073	5.83	1.13	4.53%	8
CA-OAS	2002081	8.94	1.54	2.67%	8
CA-OAS	2002089	7.21	1.66	12.95%	6
CA-OAS	2002097	9.48			1
CA-OAS	2002105	5.58	3.12	8.38%	5
CA-OAS	2002113	5.92	3.66	18.00%	8
CA-OAS	2002121	5.37	3.59	2.22%	8
CA-OAS	2002129	4.72	2.42	3.59%	8
CA-OAS	2002137	4.03	2.41	5.40%	8
CA-OAS	2002145	6.8	8.44	1.76%	8
CA-OAS	2002153	15.78	11.06	1.43%	8
CA-OAS	2002161	19.28	17.20	1.07%	8
CA-OAS	2002169	27.36	19.71	2.04%	8
CA-OAS	2002177	19.19	24.49	6.98%	8
CA-OAS	2002185	28.74	21.25	2.27%	8
CA-OAS	2002193	17.12	20.44	1.46%	8
CA-OAS	2002201	27.05	16.65	2.23%	8

CA-OAS	2002209	26.34	12.28	1.10%	8
CA-OAS	2002217	23.33			2
CA-OAS	2002225	19.24	16.67	3.94%	6
CA-OAS	2002233	22.84	17.12	1.13%	8
CA-OAS	2002241	19.38	9.63	1.43%	8
CA-OAS	2002249	18.1	13.24	0.93%	8
CA-OAS	2002257	15.37	13.86	1.47%	8
CA-OAS	2002265	7.12	4.44	2.16%	8
CA-OAS	2002273	5.29	3.72	1.78%	8
CA-OAS	2002281	3.87	2.31	3.59%	8
CA-OAS	2002289	4.51	0.88	4.93%	8
CA-OAS	2002297	3.72	0.63	6.96%	8
CA-OAS	2002305	3.62	0.26	19.27%	8
CA-OAS	2002313	2.96	-0.05	89.55%	8
CA-OAS	2002321	2.57	0.28	18.86%	8
CA-OAS	2002329	3.57	0.77	11.09%	8
CA-OAS	2002337	2.45	-0.29	23.56%	8
CA-OAS	2002345	1.39	-0.17	22.46%	8
CA-OAS	2002353	2.32	-0.03	207.67%	8
CA-OAS	2002361	1.14			0
CA-OAS	2003001	2.44	1.14	21.11%	8
CA-OAS	2003009	2.2	0.02	62.42%	8
CA-OAS	2003017	2.19	0.05	28.00%	8
CA-OAS	2003025	1.92	-0.01	295.35%	8
CA-OAS	2003033	2.18	0.36	6.97%	8
CA-OAS	2003041	2.18	0.21	7.20%	8
CA-OAS	2003049	2.16	0.39	16.59%	7
CA-OAS	2003057	2.76	0.45	9.41%	8
CA-OAS	2003065	3.14	0.50	3.67%	8
CA-OAS	2003073	8.21	0.93	10.60%	8
CA-OAS	2003081	6.86	2.10	4.01%	8
CA-OAS	2003089	7.47	2.47	2.32%	8
CA-OAS	2003097	8.14	1.87	3.78%	8
CA-OAS	2003105	6.6	2.28	5.07%	8
CA-OAS	2003113	6.81	3.20	5.73%	8
CA-OAS	2003121	6.5	3.26	18.30%	8
CA-OAS	2003129	7.63	5.86	3.03%	8
CA-OAS	2003137	10.28	8.56	2.54%	8
CA-OAS	2003145	25.03	16.19	3.19%	8
CA-OAS	2003153	24.42	13.22	7.00%	8
CA-OAS	2003161	32.66	22.98	1.01%	8
CA-OAS	2003169	26.47	19.34	3.74%	8
CA-OAS	2003177	27.88	19.19	0.96%	8
CA-OAS	2003185	26.45	15.20	1.79%	8

CA-OAS	2003193	26.04	18.87	2.43%	8
CA-OAS	2003201	22.93	12.94	0.65%	8
CA-OAS	2003209	18.66	10.08	2.52%	8
CA-OAS	2003217	25.68	14.63	4.22%	8
CA-OAS	2003225	11.27	17.24	3.34%	8
CA-OAS	2003233	21.71	9.68	1.36%	8
CA-OAS	2003241	20.91	8.22	1.56%	8
CA-OAS	2003249	11.56	8.38	9.07%	8
CA-OAS	2003257	7.24	5.66	1.94%	8
CA-OAS	2003265	5.99	6.32	3.07%	8
CA-OAS	2003273	4.19	2.93	2.93%	8
CA-OAS	2003281	4.61	1.80	7.16%	8
CA-OAS	2003289	5.66	0.69	6.51%	8
CA-OAS	2003297	4.36	3.34	4.39%	8
CA-OAS	2003305	4.6	0.51	5.45%	8
CA-OAS	2003313	4.41	0.19	25.28%	8
CA-OAS	2003321	3.13	0.37	11.21%	8
CA-OAS	2003329	4.03	0.31	11.66%	8
CA-OAS	2003337	4	0.57	6.76%	8
CA-OAS	2003345	2.29	0.51	16.96%	8
CA-OAS	2003353	3.05	-0.05	55.24%	8
CA-OAS	2003361	2.47			0
CA-OAS	2004001	2.4	0.23	7.39%	8
CA-OAS	2004009	2.62	0.23	15.62%	8
CA-OAS	2004017	2.07	0.21	29.74%	8
CA-OAS	2004025	1.29	0.26	12.45%	6
CA-OAS	2004033	2.38	0.29	19.84%	8
CA-OAS	2004041	3.41	0.98	9.01%	8
CA-OAS	2004049	3.77	0.47	10.96%	8
CA-OAS	2004057	4.1	0.58	14.33%	8
CA-OAS	2004065	6.61	0.78	9.93%	8
CA-OAS	2004073	7.04	1.41	11.46%	8
CA-OAS	2004081	9.54	0.97	5.81%	8
CA-OAS	2004089	4.21	1.58	5.32%	8
CA-OAS	2004097	4.64	2.36	2.46%	8
CA-OAS	2004105	6.68	2.41	4.47%	8
CA-OAS	2004113	6.82	4.66	3.14%	8
CA-OAS	2004121	6.51	3.54	2.85%	8
CA-OAS	2004129	6.13	4.24	2.08%	8
CA-OAS	2004137	4.56	3.86	3.43%	8
CA-OAS	2004145	10.38	4.98	11.84%	8
CA-OAS	2004153	13.11	10.91	1.45%	8
CA-OAS	2004161	16.82	11.04	1.48%	8
CA-OAS	2004169	25.09	20.75	0.68%	8

CA-OAS	2004177	28.61	21.73	1.15%	8
CA-OAS	2004185	27.3	21.93	0.79%	8
CA-OAS	2004193	27.27	24.83	1.31%	8
CA-OAS	2004201	24.93	24.91	1.78%	8
CA-OAS	2004209	25.87	21.91	0.90%	8
CA-OAS	2004217	24.43			4
CA-OAS	2004225	26.09	22.77	5.40%	8
CA-OAS	2004233	18.41	15.01	1.96%	8
CA-OAS	2004241	17.79	11.16	6.42%	8
CA-OAS	2004249	12.47	7.97	0.84%	8
CA-OAS	2004257	11.32	9.10	6.00%	8
CA-OAS	2004265	5.91	8.94	1.43%	8
CA-OAS	2004273	4.09	3.20	2.76%	8
CA-OAS	2004281	4.46	2.54	4.05%	8
CA-OAS	2004289	4.65	1.53	7.16%	8
CA-OAS	2004297	3.68	0.74	26.43%	8
CA-OAS	2004305	4.9	1.09	8.70%	8
CA-OAS	2004313	4.78	0.60	6.35%	8
CA-OAS	2004321	4.91	0.84	8.21%	8
CA-OAS	2004329	3.73	0.34	10.63%	8
CA-OAS	2004337	2.53	0.54	3.29%	8
CA-OAS	2004345	2.6	0.53	3.34%	8
CA-OAS	2004353	1.79	0.27	12.84%	8
CA-OAS	2004361	1.47			0
CA-OAS	2005001	1.87	0.21	16.27%	8
CA-OAS	2005009	1.27			4
CA-OAS	2005017	2.23	0.36	22.67%	8
CA-OAS	2005025	2.34	0.89	12.43%	8
CA-OAS	2005033	2.49	0.57	6.23%	8
CA-OAS	2005041	3.44	0.61	4.45%	8
CA-OAS	2005049	3.44	0.36	7.97%	8
CA-OAS	2005057	6.14	0.53	14.71%	8
CA-OAS	2005065	7.44			4
CA-OAS	2005073	5.91	1.00	5.10%	5
CA-OAS	2005081	9.8	1.06	4.63%	8
CA-OAS	2005089	6.82	1.77	6.69%	8
CA-OAS	2005097	9.25	0.84	6.96%	8
CA-OAS	2005105	6.33	3.99	3.74%	8
CA-OAS	2005113	7.16	3.84	1.94%	8
CA-OAS	2005121	5.92	3.62	3.23%	8
CA-OAS	2005129	4.87	4.44	17.01%	8
CA-OAS	2005137	13.62	11.91	1.51%	8
CA-OAS	2005145	16.65	11.07	0.70%	8
CA-OAS	2005153	19.79	8.72	5.70%	8

CA-OAS	2005161	25.53	17.43	1.51%	8
CA-OAS	2005169	27.75	18.16	1.06%	8
CA-OAS	2005177	24.25	20.45	1.28%	8
CA-OAS	2005185	29.78	30.87	0.49%	8
CA-OAS	2005193	27.59	27.50	2.03%	8
CA-OAS	2005201	26.91	19.10	1.47%	8
CA-OAS	2005209	23.33	27.66	1.62%	8
CA-OAS	2005217	21.92	22.59	1.34%	8
CA-OAS	2005225	20.03	11.90	2.62%	8
CA-OAS	2005233	20.5	14.50	1.98%	8
CA-OAS	2005241	19.26	16.15	1.91%	8
CA-OAS	2005249	15.28	13.31	1.84%	8
CA-OAS	2005257	7.83	8.73	1.11%	8
CA-OAS	2005265	6.51	6.34	1.33%	8
CA-OAS	2005273	6.18	3.16	3.26%	6
CA-OAS	2005281	5.88			4
CA-OAS	2005289	4.84	2.41	4.26%	8
CA-OAS	2005297	5.3	1.80	5.25%	8
CA-OAS	2005305	4.05	0.87	13.54%	8
CA-OAS	2005313	4.1	1.15	6.64%	8
CA-OAS	2005321	4.11	1.16	7.99%	8
CA-OAS	2005329	3.15	1.20	3.62%	8
CA-OAS	2005337	2.72	0.68	7.87%	8
CA-OAS	2005345	2.11	0.88	8.14%	8
CA-OAS	2005353	1.51	-0.07	89.54%	8
CA-OAS	2005361	0.79			0
CA-OAS	2006001	2.29			0
CA-OAS	2006009	2.29			2
CA-OAS	2006017	2.73	0.94	9.27%	8
CA-OAS	2006025	1.98	0.27	11.05%	6
CA-OAS	2006033	2.4	1.21	10.03%	8
CA-OAS	2006041	2.4	1.02	4.80%	8
CA-OAS	2006049	2.91	0.51	24.04%	7
CA-OAS	2006057	3.56	0.93	10.93%	6
CA-OAS	2006065	4.8	1.38	17.04%	8
CA-OAS	2006073	6.12	1.95	2.23%	8
CA-OAS	2006081	9.47	1.64	3.97%	8
CA-OAS	2006089	7.81	1.76	15.41%	8
CA-OAS	2006097	8.24	2.36	4.91%	8
CA-OAS	2006105	7.71	4.34	1.97%	8
CA-OAS	2006113	5.07	5.52	2.25%	8
CA-OAS	2006121	8.64	7.23	1.65%	8
CA-OAS	2006129	9.15	9.96	1.88%	8
CA-OAS	2006137	21.08	16.83	1.00%	8

CA-OAS	2006145	19.34	14.78	2.57%	8
CA-OAS	2006153	26.14	22.72	1.06%	8
CA-OAS	2006161	24.49	16.34	0.86%	8
CA-OAS	2006169	31.73	27.06	0.81%	8
CA-OAS	2006177	33.96	36.28	1.04%	8
CA-OAS	2006185	29.59	33.76	3.96%	8
CA-OAS	2006193	30.11	32.83	2.99%	8
CA-OAS	2006201	21.95			4
CA-OAS	2006209	24.24	24.50	2.15%	8
CA-OAS	2006217	23.79	25.46	1.24%	8
CA-OAS	2006225	26.12	28.70	0.86%	8
CA-OAS	2006233	23.76	24.09	0.94%	8
CA-OAS	2006241	20.16	22.31	1.00%	8
CA-OAS	2006249	17.39	16.40	0.97%	8
CA-OAS	2006257	6.89	5.86	8.74%	8
CA-OAS	2006265	8.54	9.38	2.02%	8
CA-OAS	2006273	7.04	3.54	2.53%	8
CA-OAS	2006281	5.64	3.29	4.02%	8
CA-OAS	2006289	4.91	1.34	4.80%	8
CA-OAS	2006297	4.65	1.24	3.44%	8
CA-OAS	2006305	4.76	0.99	5.66%	7
CA-OAS	2006313	2.9			1
CA-OAS	2006321	2.6			4
CA-OAS	2006329	2	0.80	8.39%	7
CA-OAS	2006337	2.13	0.03	154.13%	8
CA-OAS	2006345	2.07	1.09	22.43%	6
CA-OAS	2006353	3.68	0.37	7.78%	7
CA-OAS	2006361	1.54			0
CA-OAS	2007001	2.77			4
CA-OAS	2007009	1.39	1.16	13.01%	8
CA-OAS	2007017	2.19	0.10	56.04%	8
CA-OAS	2007025	2.51	1.19	7.30%	8
CA-OAS	2007033	1.59	0.14	15.86%	8
CA-OAS	2007041	2.49	0.19	14.71%	7
CA-OAS	2007049	3.4	0.45	17.66%	8
CA-OAS	2007057	3.72	0.74	8.44%	8
CA-OAS	2007065	6.92	0.82	9.31%	8
CA-OAS	2007073	5.55	1.00	8.12%	8
CA-OAS	2007081	11.5	1.79	14.52%	8
CA-OAS	2007089	8.73	1.70	7.36%	8
CA-OAS	2007097	9.03	2.29	24.73%	7
CA-OAS	2007105	10.52	2.69	4.26%	8
CA-OAS	2007113	8.85	5.79	3.51%	8
CA-OAS	2007121	9.41	7.73	3.65%	8

CA-OAS	2007129	11.71			4
CA-OAS	2007137	12.55			1
CA-OAS	2007145	17.19	12.79	1.93%	8
CA-OAS	2007153	27.68	20.42	1.55%	8
CA-OAS	2007161	26	18.82	0.88%	8
CA-OAS	2007169	28.39	24.92	1.38%	7
CA-OAS	2007177	29.09	27.20	5.42%	8
CA-OAS	2007185	31.05	32.04	2.64%	6
CA-OAS	2007193	33.43	30.18	4.42%	8
CA-OAS	2007201	24.35	36.14	0.94%	8
CA-OAS	2007209	22.06	31.07	3.20%	8
CA-OAS	2007217	22.07	23.71	2.41%	8
CA-OAS	2007225	18.8	17.25	1.36%	8
CA-OAS	2007233	16.28	16.53	1.69%	8
CA-OAS	2007241	15.87	18.17	2.66%	8
CA-OAS	2007249	9.84	11.56	1.25%	8
CA-OAS	2007257	8.08	8.91	11.79%	8
CA-OAS	2007265	4.99	5.70	2.16%	8
CA-OAS	2007273	5.03	3.54	3.53%	8
CA-OAS	2007281	6.07	2.24	2.30%	8
CA-OAS	2007289	5.55	1.81	3.26%	8
CA-OAS	2007297	5.66	1.88	6.07%	8
CA-OAS	2007305	6.18	1.61	3.85%	8
CA-OAS	2007313	4.11	1.59	3.88%	8
CA-OAS	2007321	2.37	0.46	11.67%	8
CA-OAS	2007329	1.86	0.30	5.01%	8
CA-OAS	2007337	1.82	0.12	26.16%	8
CA-OAS	2007345	1.83	0.07	17.72%	5
CA-OAS	2007353	1.84			4
CA-OAS	2007361	1.07			0
CA-OAS	2008001	2.18	0.25	16.38%	7
CA-OAS	2008009	1.79			2
CA-OAS	2008017	1.83	0.17	8.68%	8
CA-OAS	2008025	1.49	0.51	8.39%	8
CA-OAS	2008033	1.89			4
CA-OAS	2008041	2.33	0.15	7.80%	7
CA-OAS	2008049	3.55	0.29	3.85%	8
CA-OAS	2008057	3.79	0.76	9.97%	8
CA-OAS	2008065	6.77	1.18	10.14%	8
CA-OAS	2008073	7.11	1.00	5.94%	8
CA-OAS	2008081	8.69	1.05	3.45%	8
CA-OAS	2008089	8.18	1.88	4.15%	8
CA-OAS	2008097	9.35	0.95	5.05%	8
CA-OAS	2008105	8.52	3.40	4.56%	8

CA-OAS	2008113	7.55	3.69	2.47%	8
CA-OAS	2008121	5.58	4.70	2.86%	8
CA-OAS	2008129	5.22			4
CA-OAS	2008137	5.91			4
CA-OAS	2008145	13.52	13.76	4.20%	8
CA-OAS	2008153	19.34	17.35	1.33%	8
CA-OAS	2008161	22.97	20.99	23.35%	8
CA-OAS	2008169	30.98	27.95	2.25%	8
CA-OAS	2008177	24.4	31.32	1.71%	8
CA-OAS	2008185	23.92	19.19	2.90%	8
CA-OAS	2008193	25.96	28.40	2.04%	8
CA-OAS	2008201	26.07	28.67	2.65%	8
CA-OAS	2008209	26.13	25.51	1.30%	8
CA-OAS	2008217	23.51	28.43	3.52%	8
CA-OAS	2008225	23.46	30.72	5.18%	5
CA-OAS	2008233	20.19	23.27	5.02%	7
CA-OAS	2008241	18.21	16.82	6.18%	7
CA-OAS	2008249	16.11	15.95	7.47%	6
CA-OAS	2008257	14.06	11.22	5.45%	5
CA-OAS	2008265	6.49	9.37	1.93%	8
CA-OAS	2008273	4.22	5.80	1.19%	8
CA-OAS	2008281	4.57	3.61	2.42%	8
CA-OAS	2008289	5.45	2.10	3.33%	8
CA-OAS	2008297	4.77	2.28	2.08%	8
CA-OAS	2008305	5.24	1.34	5.85%	8
CA-OAS	2008313	4.13	0.86	6.59%	8
CA-OAS	2008321	3.62	0.80	6.06%	8
CA-OAS	2008329	3.08	0.55	22.23%	8
CA-OAS	2008337	2.55	0.83	3.97%	8
CA-OAS	2008345	1.47	0.16	29.36%	8
CA-OAS	2008353	1.09	-0.11	22.47%	5
CA-OAS	2008361	0.91			0
CA-OAS	2009001	1.44	0.20	17.76%	8
CA-OAS	2009009	1.62	0.40	11.91%	8
CA-OAS	2009017	3.07	0.86	2.74%	8
CA-OAS	2009025	2.43	0.54	5.21%	8
CA-OAS	2009033	2.38	0.35	12.74%	8
CA-OAS	2009041	2.57	0.62	6.56%	8
CA-OAS	2009049	3.08	0.60	5.93%	8
CA-OAS	2009057	3.57	0.88	5.51%	8
CA-OAS	2009065	3.65	0.54	2.44%	8
CA-OAS	2009073	6.1	1.13	5.62%	8
CA-OAS	2009081	7.86	1.43	15.58%	8
CA-OAS	2009089	7.67	1.19	4.38%	8

CA-OAS	2009097	7.57	1.33	4.47%	5
CA-OAS	2009105	7.35	4.04	1.93%	7
CA-OAS	2009113	5.82	2.36	2.85%	8
CA-OAS	2009121	5.47	4.48	8.12%	8
CA-OAS	2009129	5.19	5.78	1.70%	8
CA-OAS	2009137	7.18	5.53	2.31%	8
CA-OAS	2009145	9.43	9.59	2.73%	8
CA-OAS	2009153	10.48	9.27	1.33%	8
CA-OAS	2009161	23.27	21.46	0.94%	8
CA-OAS	2009169	25.65	21.70	3.12%	8
CA-OAS	2009177	28.94	24.76	1.23%	8
CA-OAS	2009185	24.06	22.67	5.11%	8
CA-OAS	2009193	27.92			0
CA-OAS	2009201	27.25	33.82	2.73%	5
CA-OAS	2009209	25.9	22.43	4.41%	8
CA-OAS	2009217	24.48	25.93	3.21%	8
CA-OAS	2009225	21.6	16.24	0.76%	8
CA-OAS	2009233	24.97			4
CA-OAS	2009241	22.83	21.12	0.97%	8
CA-OAS	2009249	20.24	17.19	0.82%	8
CA-OAS	2009257	15.42	13.75	2.19%	8
CA-OAS	2009265	10.5	13.32	1.60%	8
CA-OAS	2009273	5.44	5.70	1.89%	8
CA-OAS	2009281	3.56	2.77	2.06%	8
CA-OAS	2009289	4.21	1.68	2.20%	8
CA-OAS	2009297	4.37	1.35	4.63%	8
CA-OAS	2009305	4.88	1.09	4.81%	8
CA-OAS	2009313	5.65	0.51	7.39%	8
CA-OAS	2009321	5.77	0.53	6.22%	8
CA-OAS	2009329	3.43	0.76	4.70%	8
CA-OAS	2009337	3.07			4
CA-OAS	2009345	2.24	0.08	9.05%	5
CA-OAS	2009353	2.59	0.18	15.76%	8
CA-OAS	2009361	1.75			0
CA-Ojp	2000001	1.736364	0.22	11.86%	6
CA-Ojp	2000009	1.254545	0.85	6.58%	8
CA-Ojp	2000017	1.581818			4
CA-Ojp	2000025	1.909091	0.77	7.44%	8
CA-Ojp	2000033	1.981818	0.35	9.51%	8
CA-Ojp	2000041	1.454545	0.19	7.85%	8
CA-Ojp	2000049	3.654545	0.92	17.13%	8
CA-Ojp	2000057	4.263636	3.26	2.83%	8
CA-Ojp	2000065	4.227273	1.19	15.84%	8
CA-Ojp	2000073	5.745455	2.03	4.83%	8

CA-Ojp	2000081	4.945455	2.20	5.03%	8
CA-Ojp	2000089	5.872727			1
CA-Ojp	2000097	4.6	3.06	2.90%	8
CA-Ojp	2000105	6.145455	3.65	3.12%	8
CA-Ojp	2000113	7.636364	6.66	2.15%	8
CA-Ojp	2000121	9.181818	8.11	1.49%	8
CA-Ojp	2000129	8.427273	4.15	2.63%	8
CA-Ojp	2000137	11.26364	8.39	4.18%	8
CA-Ojp	2000145	12.66364	12.93	6.91%	8
CA-Ojp	2000153	12.7	7.66	1.45%	8
CA-Ojp	2000161	14.84545	10.53	8.79%	8
CA-Ojp	2000169	16.16364	15.29	3.17%	8
CA-Ojp	2000177	15.25455	14.50	2.42%	8
CA-Ojp	2000185	17.71818	11.88	3.46%	8
CA-Ojp	2000193	17.45455	16.85	2.16%	8
CA-Ojp	2000201	18.08182	14.25	0.56%	8
CA-Ojp	2000209	16.78182	13.78	2.07%	8
CA-Ojp	2000217	16.89091	12.44	8.40%	8
CA-Ojp	2000225	16.99091	14.15	0.85%	8
CA-Ojp	2000233	15.3	12.34	1.28%	8
CA-Ojp	2000241	10.37273	6.78	4.94%	8
CA-Ojp	2000249	10.14545	8.65	1.81%	8
CA-Ojp	2000257	7.163636	7.21	1.75%	8
CA-Ojp	2000265	4.709091	4.58	2.32%	8
CA-Ojp	2000273	4.309091	3.77	1.71%	8
CA-Ojp	2000281	3.472727	2.31	1.79%	8
CA-Ojp	2000289	3.754545	1.98	3.05%	8
CA-Ojp	2000297	3.390909	1.10	15.54%	8
CA-Ojp	2000305	3.127273	1.69	4.48%	8
CA-Ojp	2000313	3.736364	0.91	4.22%	8
CA-Ojp	2000321	2.818182	0.96	5.10%	8
CA-Ojp	2000329	2.554545	0.61	17.92%	8
CA-Ojp	2000337	2.254545	0.57	6.23%	8
CA-Ojp	2000345	1.272727	0.07	19.47%	8
CA-Ojp	2000353	1.036364	0.23	8.04%	8
CA-Ojp	2000361	1.063636			0
CA-Ojp	2001001	1.709091	1.29	2.54%	8
CA-Ojp	2001009	1.618182	0.28	13.33%	8
CA-Ojp	2001017	1.954545	0.23	27.71%	8
CA-Ojp	2001025	1.845455	0.49	4.99%	8
CA-Ojp	2001033	2.054545	0.99	3.95%	8
CA-Ojp	2001041	1.654545	0.75	3.79%	8
CA-Ojp	2001049	2.018182	0.39	7.83%	8
CA-Ojp	2001057	4.7	0.72	5.49%	8

CA-Ojp	2001065	5.381818	1.60	12.29%	8
CA-Ojp	2001073	4.772727	1.39	3.58%	8
CA-Ojp	2001081	5.145455	1.04	2.34%	8
CA-Ojp	2001089	6.418182	2.45	3.91%	8
CA-Ojp	2001097	6.154545	3.03	5.70%	8
CA-Ojp	2001105	4.2	4.37	1.79%	8
CA-Ojp	2001113	7.1	5.83	2.72%	8
CA-Ojp	2001121	7.545455	5.49	1.82%	8
CA-Ojp	2001129	9.427273	8.16	7.77%	8
CA-Ojp	2001137	9.972727	9.58	5.10%	8
CA-Ojp	2001145	14.48182	7.83	3.67%	8
CA-Ojp	2001153	13.34545	7.47	1.05%	8
CA-Ojp	2001161	12.74545	10.51	3.54%	8
CA-Ojp	2001169	14.08182	9.19	1.58%	8
CA-Ojp	2001177	15.70909	11.97	2.30%	8
CA-Ojp	2001185	16.95455	11.03	1.51%	8
CA-Ojp	2001193	18.47273	14.06	5.32%	8
CA-Ojp	2001201	16.82727	12.49	2.20%	8
CA-Ojp	2001209	13.49091	17.24	1.36%	8
CA-Ojp	2001217	14.70909	15.82	1.19%	8
CA-Ojp	2001225	14.12727	14.29	1.02%	8
CA-Ojp	2001233	12.35455	9.26	1.48%	8
CA-Ojp	2001241	11.39091	9.83	3.40%	8
CA-Ojp	2001249	8.263636	6.92	2.76%	8
CA-Ojp	2001257	7.718182	5.35	1.97%	8
CA-Ojp	2001265	5.572727	4.14	2.45%	8
CA-Ojp	2001273	3.809091	4.62	3.12%	8
CA-Ojp	2001281	3.936364	3.30	3.88%	8
CA-Ojp	2001289	3.263636	1.59	3.59%	8
CA-Ojp	2001297	3	0.97	5.65%	8
CA-Ojp	2001305	3.145455	1.74	16.64%	8
CA-Ojp	2001313	2.772727	0.70	20.16%	8
CA-Ojp	2001321	4.3	0.86	2.95%	8
CA-Ojp	2001329	3.236364	0.46	5.08%	8
CA-Ojp	2001337	2.945455	0.94	5.41%	8
CA-Ojp	2001345	2.072727	0.77	4.17%	8
CA-Ojp	2001353	1.472727	0.32	21.21%	8
CA-Ojp	2001361	0.981818			0
CA-Ojp	2002001	1.872727	0.31	12.03%	8
CA-Ojp	2002009	1.963636	0.88	6.37%	8
CA-Ojp	2002017	1.090909	0.44	4.51%	8
CA-Ojp	2002025	1.054545	0.54	4.77%	8
CA-Ojp	2002033	1.827273	0.96	5.01%	8
CA-Ojp	2002041	2.945455	1.28	5.36%	8

CA-Ojp	2002049	3.090909	1.15	4.67%	8
CA-Ojp	2002057	2.545455	1.10	4.30%	8
CA-Ojp	2002065	3.7	1.18	2.74%	8
CA-Ojp	2002073	4.272727	1.84	3.83%	8
CA-Ojp	2002081	7.536364	1.46	4.14%	8
CA-Ojp	2002089	6.009091	1.57	2.89%	8
CA-Ojp	2002097	9.154545	1.93	18.11%	7
CA-Ojp	2002105	6.027273	3.51	18.97%	7
CA-Ojp	2002113	5.518182	5.37	3.19%	8
CA-Ojp	2002121	5.381818	4.97	2.45%	8
CA-Ojp	2002129	7.109091	4.40	1.87%	8
CA-Ojp	2002137	6.309091	4.42	1.90%	8
CA-Ojp	2002145	10.44545	7.37	1.48%	8
CA-Ojp	2002153	13.07273	6.50	5.54%	5
CA-Ojp	2002161	13.36364	10.20	1.83%	8
CA-Ojp	2002169	14.03636	10.75	4.17%	8
CA-Ojp	2002177	10	13.45	0.81%	8
CA-Ojp	2002185	15.90909	12.18	2.20%	8
CA-Ojp	2002193	13.98182	13.50	3.36%	8
CA-Ojp	2002201	15.52727	18.29	3.20%	8
CA-Ojp	2002209	15.26364	14.80	1.67%	8
CA-Ojp	2002217	14.9	12.57	5.28%	8
CA-Ojp	2002225	12.39091	12.75	4.49%	8
CA-Ojp	2002233	13.34545	13.55	1.79%	8
CA-Ojp	2002241	11.5	8.88	1.05%	8
CA-Ojp	2002249	9.518182	6.32	9.85%	5
CA-Ojp	2002257	6.945455	9.86	2.65%	8
CA-Ojp	2002265	3.754545	4.67	1.38%	8
CA-Ojp	2002273	4.309091	4.39	4.77%	8
CA-Ojp	2002281	3.272727	3.64	4.23%	8
CA-Ojp	2002289	2.963636	1.53	3.46%	8
CA-Ojp	2002297	2.736364	1.54	4.87%	8
CA-Ojp	2002305	3.027273	0.60	5.66%	8
CA-Ojp	2002313	2.363636	0.58	5.38%	8
CA-Ojp	2002321	1.963636	0.97	3.75%	8
CA-Ojp	2002329	2.827273	1.01	7.94%	8
CA-Ojp	2002337	2.027273	0.14	24.02%	8
CA-Ojp	2002345	1.527273			1
CA-Ojp	2002353	1.809091	0.60	10.88%	7
CA-Ojp	2002361	0.9			0
CA-Ojp	2003001	2.427273	1.44	7.97%	8
CA-Ojp	2003009	2.709091	0.15	10.43%	8
CA-Ojp	2003017	2.2	0.30	2.99%	8
CA-Ojp	2003025	1.818182	0.35	8.67%	8

CA-Ojp	2003033	1.709091	0.95	2.11%	8
CA-Ojp	2003041	1.763636	0.69	2.66%	8
CA-Ojp	2003049	1.627273	0.58	2.84%	8
CA-Ojp	2003057	2.118182	0.79	3.00%	8
CA-Ojp	2003065	2.672727	0.69	3.63%	8
CA-Ojp	2003073	6.936364	0.51	6.68%	8
CA-Ojp	2003081	6.654545	2.71	5.22%	8
CA-Ojp	2003089	5.972727	1.90	4.09%	8
CA-Ojp	2003097	7.118182	2.09	10.82%	8
CA-Ojp	2003105	7.2	3.88	9.16%	8
CA-Ojp	2003113	7.681818	3.19	2.14%	8
CA-Ojp	2003121	8.581818	4.46	10.23%	8
CA-Ojp	2003129	9.609091	7.09	4.00%	8
CA-Ojp	2003137	9.881818	7.75	1.61%	8
CA-Ojp	2003145	14.18182	11.30	4.83%	8
CA-Ojp	2003153	13.55455	8.72	8.48%	8
CA-Ojp	2003161	14.5	12.83	3.77%	8
CA-Ojp	2003169	14.79091	11.79	4.00%	8
CA-Ojp	2003177	16.58182	13.78	10.83%	8
CA-Ojp	2003185	15.9	12.54	3.21%	8
CA-Ojp	2003193	16.40909	16.05	4.34%	8
CA-Ojp	2003201	15.03636	11.26	2.26%	8
CA-Ojp	2003209	12.47273	9.87	2.49%	5
CA-Ojp	2003217	15	9.90	7.29%	8
CA-Ojp	2003225	7.7	7.96	5.42%	8
CA-Ojp	2003233	12.06364	9.09	2.32%	8
CA-Ojp	2003241	12	8.59	1.49%	8
CA-Ojp	2003249	10.82727	7.67	5.16%	8
CA-Ojp	2003257	6.781818			2
CA-Ojp	2003265	5.663636	5.28	1.36%	5
CA-Ojp	2003273	4.554545	3.88	2.14%	8
CA-Ojp	2003281	4.109091	3.66	7.91%	8
CA-Ojp	2003289	4.118182	1.42	5.13%	5
CA-Ojp	2003297	2.945455			4
CA-Ojp	2003305	2.736364	0.60	7.36%	8
CA-Ojp	2003313	2.972727	0.30	12.08%	8
CA-Ojp	2003321	2.263636	0.40	6.64%	8
CA-Ojp	2003329	3.372727	0.50	6.32%	8
CA-Ojp	2003337	2.909091	0.72	11.41%	8
CA-Ojp	2003345	1.936364	0.33	9.94%	8
CA-Ojp	2003353	2.654545	0.26	13.94%	8
CA-Ojp	2003361	2.072727			0
CA-Ojp	2004001	1.781818			1
CA-Ojp	2004009	1.763636	0.34	8.13%	8

CA-Ojp	2004017	1.336364	0.51	4.20%	8
CA-Ojp	2004025	0.863636	0.26	7.67%	8
CA-Ojp	2004033	1.8	0.87	6.03%	8
CA-Ojp	2004041	2.036364	0.94	4.58%	8
CA-Ojp	2004049	2.854545	0.62	10.61%	7
CA-Ojp	2004057	3.127273	1.43	9.76%	8
CA-Ojp	2004065	4.136364	1.24	5.10%	8
CA-Ojp	2004073	4.763636	2.21	5.51%	8
CA-Ojp	2004081	8.1	2.51	7.73%	8
CA-Ojp	2004089	4.427273	1.84	3.99%	8
CA-Ojp	2004097	4.181818	3.08	4.21%	8
CA-Ojp	2004105	6.290909	4.44	5.04%	8
CA-Ojp	2004113	8.036364	6.12	2.14%	8
CA-Ojp	2004121	6.672727	4.59	3.89%	8
CA-Ojp	2004129	6.990909	6.06	12.20%	8
CA-Ojp	2004137	7.109091	6.64	10.28%	7
CA-Ojp	2004145	8.654545	7.76	22.66%	8
CA-Ojp	2004153	14.11818	11.81	11.77%	8
CA-Ojp	2004161	14.30909	11.27	12.01%	8
CA-Ojp	2004169	12.65455	14.74	0.89%	8
CA-Ojp	2004177	16.31818	10.83	2.03%	8
CA-Ojp	2004185	19.34545	12.59	4.27%	8
CA-Ojp	2004193	18.49091	16.13	3.98%	7
CA-Ojp	2004201	19.2			0
CA-Ojp	2004209	16.58182			0
CA-Ojp	2004217	16.33636			4
CA-Ojp	2004225	15.02727	17.83	1.93%	8
CA-Ojp	2004233	9.963636	11.17	6.68%	8
CA-Ojp	2004241	9.972727	9.16	10.75%	7
CA-Ojp	2004249	8.318182	9.30	14.02%	8
CA-Ojp	2004257	9.045455	10.19	3.10%	5
CA-Ojp	2004265	5.172727	10.01	1.67%	8
CA-Ojp	2004273	4.209091	5.90	1.78%	8
CA-Ojp	2004281	4.636364	5.20	3.09%	8
CA-Ojp	2004289	3.445455	1.37	3.55%	8
CA-Ojp	2004297	2.854545			2
CA-Ojp	2004305	3.227273			0
CA-Ojp	2004313	3.554545	0.33	13.51%	6
CA-Ojp	2004321	3.818182	1.19	5.38%	8
CA-Ojp	2004329	2.763636	0.75	7.07%	8
CA-Ojp	2004337	1.554545	0.45	2.17%	8
CA-Ojp	2004345	1.672727	1.48	2.75%	8
CA-Ojp	2004353	1.172727	0.34	3.61%	8
CA-Ojp	2004361	1.272727			0

CA-Ojp	2005001	1.5	0.68	13.83%	8
CA-Ojp	2005009	1.072727	0.27	7.77%	8
CA-Ojp	2005017	1.536364	0.69	4.26%	8
CA-Ojp	2005025	1.627273	1.15	9.32%	8
CA-Ojp	2005033	1.745455	1.49	6.77%	8
CA-Ojp	2005041	2.418182	0.46	3.69%	5
CA-Ojp	2005049	2.581818	0.39	9.41%	8
CA-Ojp	2005057	4.418182	0.74	11.31%	8
CA-Ojp	2005065	4.527273	1.18	8.56%	5
CA-Ojp	2005073	4.345455	0.83	7.57%	5
CA-Ojp	2005081	7.627273	2.03	4.40%	8
CA-Ojp	2005089	4.890909	2.56	4.92%	8
CA-Ojp	2005097	8.854545	2.49	2.20%	8
CA-Ojp	2005105	6.836364	6.72	5.95%	8
CA-Ojp	2005113	6.981818	4.68	1.54%	8
CA-Ojp	2005121	6.945455	5.57	1.62%	8
CA-Ojp	2005129	6.418182	4.24	5.53%	6
CA-Ojp	2005137	13.06364	9.51	6.33%	8
CA-Ojp	2005145	13.29091	9.34	1.83%	8
CA-Ojp	2005153	13.37273	6.16	9.38%	8
CA-Ojp	2005161	13.61818	11.32	2.79%	8
CA-Ojp	2005169	19.21818	15.47	2.85%	8
CA-Ojp	2005177	19.11818	11.56	2.04%	8
CA-Ojp	2005185	18.99091	14.38	6.06%	8
CA-Ojp	2005193	17.20909	13.73	14.55%	7
CA-Ojp	2005201	16.69091	11.91	5.50%	7
CA-Ojp	2005209	14.43636	9.15	3.88%	6
CA-Ojp	2005217	13.88182	9.98	7.86%	7
CA-Ojp	2005225	13.01818	8.30	4.38%	8
CA-Ojp	2005233	14.60909	11.14	4.21%	8
CA-Ojp	2005241	11.35455	10.62	4.69%	8
CA-Ojp	2005249	11.02727	11.92	5.23%	7
CA-Ojp	2005257	7.018182	8.18	1.69%	6
CA-Ojp	2005265	5.709091	8.70	2.28%	8
CA-Ojp	2005273	4.627273	3.68	3.46%	8
CA-Ojp	2005281	4.827273	4.86	1.93%	8
CA-Ojp	2005289	3.190909	2.21	5.33%	8
CA-Ojp	2005297	3.3	1.72	3.86%	8
CA-Ojp	2005305	2.836364	0.59	5.36%	8
CA-Ojp	2005313	3.090909	1.37	4.14%	8
CA-Ojp	2005321	3.381818	0.90	12.09%	8
CA-Ojp	2005329	3.072727	0.75	5.83%	8
CA-Ojp	2005337	2.645455	0.67	6.89%	8
CA-Ojp	2005345	1.927273	1.29	2.92%	5

CA-Ojp	2005353	1.563636	0.20	27.37%	8
CA-Ojp	2005361	0.863636			0
CA-Ojp	2006001	1.463636			3
CA-Ojp	2006009	1.518182	0.56	4.58%	8
CA-Ojp	2006017	1.572727	1.33	4.21%	8
CA-Ojp	2006025	1.563636	0.48	8.54%	8
CA-Ojp	2006033	2.036364			4
CA-Ojp	2006041	1.781818	1.68	8.67%	5
CA-Ojp	2006049	2.490909	1.09	4.70%	8
CA-Ojp	2006057	2.963636	0.93	2.88%	8
CA-Ojp	2006065	4.381818	2.18	2.71%	8
CA-Ojp	2006073	5.072727	1.80	2.74%	8
CA-Ojp	2006081	8.872727	1.67	3.41%	8
CA-Ojp	2006089	5.827273	1.93	2.61%	8
CA-Ojp	2006097	6.627273	3.32	4.71%	6
CA-Ojp	2006105	8.390909	5.29	4.16%	8
CA-Ojp	2006113	8.263636	6.16	5.14%	8
CA-Ojp	2006121	9.790909	6.47	4.74%	8
CA-Ojp	2006129	9.672727			0
CA-Ojp	2006137	13.61818	7.40	8.15%	8
CA-Ojp	2006145	15.53636	10.00	1.17%	8
CA-Ojp	2006153	15.40909	10.16	1.17%	8
CA-Ojp	2006161	18.03636	9.54	3.59%	8
CA-Ojp	2006169	20.87273	15.14	10.78%	8
CA-Ojp	2006177	23.20909			4
CA-Ojp	2006185	19.65455			0
CA-Ojp	2006193	19.23636			0
CA-Ojp	2006201	16.93636	15.25	1.56%	7
CA-Ojp	2006209	16.4			4
CA-Ojp	2006217	16.81818			1
CA-Ojp	2006225	15.50909	15.86	11.74%	8
CA-Ojp	2006233	14.24545	9.09	3.75%	8
CA-Ojp	2006241	11.21818	10.62	2.26%	8
CA-Ojp	2006249	9.727273	8.48	11.89%	8
CA-Ojp	2006257	5.9			3
CA-Ojp	2006265	6.963636	6.96	2.62%	8
CA-Ojp	2006273	5.463636	5.19	1.38%	8
CA-Ojp	2006281	3.809091	4.26	1.65%	8
CA-Ojp	2006289	3.254545	1.08	2.75%	8
CA-Ojp	2006297	3.354545	1.96	6.42%	8
CA-Ojp	2006305	3.309091	1.09	7.69%	8
CA-Ojp	2006313	2.045455	1.52	33.16%	8
CA-Ojp	2006321	1.518182	1.11	4.43%	8
CA-Ojp	2006329	1.481818	0.72	8.40%	8

CA-Ojp	2006337	1.7	0.99	6.76%	8
CA-Ojp	2006345	1.618182	0.60	9.42%	8
CA-Ojp	2006353	2.436364	1.88	5.19%	8
CA-Ojp	2006361	1.109091			0
CA-Ojp	2007001	1.872727			1
CA-Ojp	2007009	1			0
CA-Ojp	2007017	1.690909			1
CA-Ojp	2007025	1.545455			4
CA-Ojp	2007033	1.127273	0.22	7.06%	8
CA-Ojp	2007041	1.645455	0.36	2.71%	8
CA-Ojp	2007049	2.454545	1.41	11.04%	5
CA-Ojp	2007057	2.627273	1.66	2.56%	8
CA-Ojp	2007065	5.645455	1.92	2.86%	8
CA-Ojp	2007073	3.945455	1.25	6.33%	7
CA-Ojp	2007081	7.809091	2.31	10.13%	8
CA-Ojp	2007089	5.881818	2.32	2.09%	8
CA-Ojp	2007097	5.254545	2.01	3.05%	8
CA-Ojp	2007105	9.036364	3.04	11.66%	8
CA-Ojp	2007113	7.836364	7.25	2.84%	8
CA-Ojp	2007121	10	8.11	2.82%	8
CA-Ojp	2007129	10.39091	9.75	1.77%	8
CA-Ojp	2007137	12.57273	7.75	1.47%	8
CA-Ojp	2007145	12.07273	9.27	0.76%	8
CA-Ojp	2007153	13.9	11.21	1.37%	8
CA-Ojp	2007161	16.18182	11.07	1.06%	8
CA-Ojp	2007169	17.43636			3
CA-Ojp	2007177	19	13.71	2.38%	8
CA-Ojp	2007185	19.67273	17.99	1.15%	8
CA-Ojp	2007193	22.1	13.58	0.92%	8
CA-Ojp	2007201	18.72727	18.03	1.59%	8
CA-Ojp	2007209	16.7	14.39	1.87%	8
CA-Ojp	2007217	18.18182	16.30	1.55%	8
CA-Ojp	2007225	15.70909	10.69	1.06%	8
CA-Ojp	2007233	12.84545	9.97	1.29%	8
CA-Ojp	2007241	11.46364	11.58	0.78%	8
CA-Ojp	2007249	8.427273	8.07	0.88%	8
CA-Ojp	2007257	6.981818	7.52	1.20%	8
CA-Ojp	2007265	5.936364	5.57	1.16%	8
CA-Ojp	2007273	4.2	4.88	1.03%	8
CA-Ojp	2007281	4.081818	2.64	2.77%	8
CA-Ojp	2007289	3.981818	2.26	3.19%	8
CA-Ojp	2007297	3.763636	1.90	3.99%	8
CA-Ojp	2007305	4.8	1.15	4.99%	8
CA-Ojp	2007313	2.654545	1.34	5.11%	8

CA-Ojp	2007321	1.909091	0.59	6.85%	8
CA-Ojp	2007329	1.663636	0.66	2.60%	8
CA-Ojp	2007337	1.609091	0.34	5.38%	8
CA-Ojp	2007345	1.690909	0.25	6.42%	8
CA-Ojp	2007353	1.636364	0.37	8.57%	8
CA-Ojp	2007361	0.927273			0
CA-Ojp	2008001	1.927273	0.67	7.67%	8
CA-Ojp	2008009	1.536364	0.30	10.40%	8
CA-Ojp	2008017	1.472727	0.45	3.76%	8
CA-Ojp	2008025	1.218182	0.52	1.91%	8
CA-Ojp	2008033	1.509091	0.55	2.45%	8
CA-Ojp	2008041	1.4	0.72	2.33%	8
CA-Ojp	2008049	2.818182	0.66	2.59%	8
CA-Ojp	2008057	2.609091	0.81	5.45%	8
CA-Ojp	2008065	4.863636	0.92	11.37%	6
CA-Ojp	2008073	5.527273	1.35	9.68%	8
CA-Ojp	2008081	7.190909	1.21	3.38%	8
CA-Ojp	2008089	7.109091	1.79	8.10%	6
CA-Ojp	2008097	7.518182			4
CA-Ojp	2008105	6.981818	3.26	3.03%	8
CA-Ojp	2008113	5.863636	3.08	2.97%	5
CA-Ojp	2008121	5.327273	3.85	2.15%	8
CA-Ojp	2008129	7.081818	3.93	3.16%	8
CA-Ojp	2008137	10.06364	6.28	1.68%	8
CA-Ojp	2008145	10.15455	9.32	2.17%	8
CA-Ojp	2008153	11.30909	8.50	1.18%	8
CA-Ojp	2008161	12.32727	7.92	1.32%	8
CA-Ojp	2008169	13.94545	11.05	12.59%	8
CA-Ojp	2008177	14.48182	11.81	1.21%	8
CA-Ojp	2008185	16.14545	10.96	1.20%	8
CA-Ojp	2008193	17.33636	18.51	1.55%	8
CA-Ojp	2008201	19.21818	14.41	0.57%	8
CA-Ojp	2008209	18.33636	15.19	1.19%	8
CA-Ojp	2008217	17.55455	11.81	0.92%	8
CA-Ojp	2008225	16.72727	14.05	0.99%	8
CA-Ojp	2008233	12.98182	12.10	1.63%	8
CA-Ojp	2008241	10.48182	10.92	1.92%	8
CA-Ojp	2008249	9.109091	9.22	0.53%	8
CA-Ojp	2008257	6.836364	6.72	0.81%	8
CA-Ojp	2008265	5.590909	4.89	1.91%	8
CA-Ojp	2008273	4.809091	5.19	1.71%	8
CA-Ojp	2008281	3.654545	3.90	1.28%	8
CA-Ojp	2008289	3.845455	3.55	2.67%	8
CA-Ojp	2008297	3.527273			3

CA-Ojp	2008305	3.5	0.84	3.79%	8
CA-Ojp	2008313	3.709091	0.74	9.78%	5
CA-Ojp	2008321	3.254545	1.21	3.29%	8
CA-Ojp	2008329	2.663636	0.54	37.21%	7
CA-Ojp	2008337	1.790909	0.73	4.25%	8
CA-Ojp	2008345	1.172727	0.21	6.51%	8
CA-Ojp	2008353	0.918182	0.14	20.65%	8
CA-Ojp	2008361	0.818182			0
CA-Ojp	2009001	1.218182	0.12	13.32%	8
CA-Ojp	2009009	1.090909	0.29	5.11%	8
CA-Ojp	2009017	1.918182	0.69	4.10%	8
CA-Ojp	2009025	1.454545	0.92	6.42%	8
CA-Ojp	2009033	1.818182	0.70	7.20%	8
CA-Ojp	2009041	1.972727	0.58	8.19%	8
CA-Ojp	2009049	2.154545	0.68	3.61%	8
CA-Ojp	2009057	3.1			3
CA-Ojp	2009065	2.618182	0.94	1.32%	8
CA-Ojp	2009073	5.181818	1.16	2.62%	8
CA-Ojp	2009081	6.936364	1.33	6.42%	8
CA-Ojp	2009089	7.263636	1.63	4.21%	8
CA-Ojp	2009097	7.2	1.34	3.31%	8
CA-Ojp	2009105	7.654545	4.10	18.82%	8
CA-Ojp	2009113	5.5	2.41	5.84%	8
CA-Ojp	2009121	7.272727	4.52	19.59%	8
CA-Ojp	2009129	7.290909	6.48	1.18%	8
CA-Ojp	2009137	8.954545	6.99	1.25%	8
CA-Ojp	2009145	11.50909	9.06	0.78%	8
CA-Ojp	2009153	9.745455	7.32	1.20%	8
CA-Ojp	2009161	10.39091	11.73	1.22%	8
CA-Ojp	2009169	14.7	10.81	5.34%	8
CA-Ojp	2009177	14.97273	14.05	1.24%	8
CA-Ojp	2009185	14.97273	14.48	0.78%	8
CA-Ojp	2009193	16.67273	14.37	1.27%	8
CA-Ojp	2009201	18.9	19.08	2.23%	8
CA-Ojp	2009209	16.94545	13.02	2.72%	8
CA-Ojp	2009217	15.88182	14.23	2.74%	8
CA-Ojp	2009225	15.61818			2
CA-Ojp	2009233	16.54545			2
CA-Ojp	2009241	14.16364	11.66	1.14%	8
CA-Ojp	2009249	10.24545	9.65	1.23%	8
CA-Ojp	2009257	9.390909	9.22	1.22%	8
CA-Ojp	2009265	6.3	7.76	2.44%	8
CA-Ojp	2009273	4.918182	4.08	1.40%	8
CA-Ojp	2009281	3.690909	2.50	2.98%	8

CA-Ojp	2009289	3.281818	1.94	4.23%	8
CA-Ojp	2009297	2.436364	1.46	4.13%	8
CA-Ojp	2009305	3.190909	1.92	4.46%	8
CA-Ojp	2009313	3.636364	0.64	6.15%	8
CA-Ojp	2009321	4.045455	0.59	5.31%	8
CA-Ojp	2009329	2.954545	0.54	4.84%	8
CA-Ojp	2009337	2.4	0.31	6.44%	8
CA-Ojp	2009345	1.790909	0.12	3.66%	8
CA-Ojp	2009353	2.109091	0.22	12.00%	8
CA-Ojp	2009361	1.336364			0
CA-Qcu	2004001	1.591667	0.39	6.21%	6
CA-Qcu	2004009	1.15	0.08	27.12%	8
CA-Qcu	2004017	1.883333	0.19	12.43%	8
CA-Qcu	2004025	1.691667	0.11	14.17%	6
CA-Qcu	2004033	2.266667	0.17	9.08%	5
CA-Qcu	2004041	2.183333	0.15	9.85%	8
CA-Qcu	2004049	2.983333	0.41	11.26%	7
CA-Qcu	2004057	3.466667	0.78	14.52%	8
CA-Qcu	2004065	4.2			1
CA-Qcu	2004073	4.1			0
CA-Qcu	2004081	5.483333			0
CA-Qcu	2004089	8.133333			2
CA-Qcu	2004097	8.991667	2.68	10.05%	7
CA-Qcu	2004105	10.075			0
CA-Qcu	2004113	10.83333			0
CA-Qcu	2004121	12.28333			0
CA-Qcu	2004129	12.2			0
CA-Qcu	2004137	9.675	19.91	5.38%	7
CA-Qcu	2004145	11.68333	16.18	16.01%	8
CA-Qcu	2004153	14.59167	18.21	16.25%	8
CA-Qcu	2004161	15.21667	19.47	5.71%	8
CA-Qcu	2004169	19.60833	19.78	10.02%	5
CA-Qcu	2004177	18.11667	23.88	10.77%	5
CA-Qcu	2004185	19.025	21.05	13.02%	6
CA-Qcu	2004193	24.6			4
CA-Qcu	2004201	19.34167	17.46	8.89%	8
CA-Qcu	2004209	23.1	19.34	8.54%	8
CA-Qcu	2004217	19.64167	16.12	8.66%	6
CA-Qcu	2004225	21.05	19.98	8.61%	7
CA-Qcu	2004233	17.1	14.89	15.05%	8
CA-Qcu	2004241	13.45833	13.64	13.81%	6
CA-Qcu	2004249	13.74167	13.93	8.65%	8
CA-Qcu	2004257	12.625	13.92	13.66%	8

CA-Qcu	2004265	11.70833	11.09	16.10%	8
CA-Qcu	2004273	6.608333	10.59	13.78%	6
CA-Qcu	2004281	6.408333			1
CA-Qcu	2004289	4.241667	5.15	5.20%	5
CA-Qcu	2004297	3.858333	3.27	11.75%	8
CA-Qcu	2004305	2.891667	3.22	16.75%	8
CA-Qcu	2004313	2.258333			4
CA-Qcu	2004321	2.091667	1.63	20.82%	8
CA-Qcu	2004329	2.65	1.83	11.52%	6
CA-Qcu	2004337	1.641667	0.47	6.47%	8
CA-Qcu	2004345	1.866667	0.11	35.31%	7
CA-Qcu	2004353	1.3	0.30	7.91%	5
CA-Qcu	2004361	0.9			0
CA-Qcu	2005001	1.658333	0.15	23.15%	8
CA-Qcu	2005009	2.016667	0.32	20.76%	8
CA-Qcu	2005017	1.291667	-0.04	36.61%	7
CA-Qcu	2005025	1.833333	0.09	16.95%	8
CA-Qcu	2005033	2.825	1.06	13.36%	8
CA-Qcu	2005041	2.708333	0.35	13.51%	8
CA-Qcu	2005049	2.45	0.12	17.14%	8
CA-Qcu	2005057	3.125	1.56	3.41%	8
CA-Qcu	2005065	3.391667	0.72	9.05%	8
CA-Qcu	2005073	5.4	1.20	7.07%	8
CA-Qcu	2005081	7.583333	1.86	5.17%	8
CA-Qcu	2005089	7.725	3.71	17.57%	7
CA-Qcu	2005097	8.75	6.01	3.06%	8
CA-Qcu	2005105	6.525	7.68	4.87%	8
CA-Qcu	2005113	10.86667			3
CA-Qcu	2005121	9.008333	12.05	0.76%	5
CA-Qcu	2005129	9.566667	9.53	18.16%	8
CA-Qcu	2005137	13.25833	9.16	7.42%	7
CA-Qcu	2005145	15.375	13.51	11.51%	8
CA-Qcu	2005153	17.50833	18.52	14.69%	8
CA-Qcu	2005161	21.23333	21.93	27.94%	7
CA-Qcu	2005169	23.60833	23.44	6.73%	8
CA-Qcu	2005177	25.98333	23.80	10.86%	8
CA-Qcu	2005185	27.38333	19.88	3.24%	8
CA-Qcu	2005193	30.05833	18.93	16.49%	8
CA-Qcu	2005201	23.975	17.57	5.36%	8
CA-Qcu	2005209	21.88333			3
CA-Qcu	2005217	23.33333	19.67	9.71%	7
CA-Qcu	2005225	18.625			3
CA-Qcu	2005233	19.25			4
CA-Qcu	2005241	16.83333			3

CA-Qcu	2005249	14.9	13.94	7.71%	8
CA-Qcu	2005257	12.35			1
CA-Qcu	2005265	7.25			4
CA-Qcu	2005273	7.866667	12.45	8.48%	5
CA-Qcu	2005281	5.025	5.85	5.34%	6
CA-Qcu	2005289	5.366667			1
CA-Qcu	2005297	3.791667	4.22	10.36%	7
CA-Qcu	2005305	3.183333	3.12	19.48%	6
CA-Qcu	2005313	3.458333	2.43	17.96%	8
CA-Qcu	2005321	3.633333	1.71	8.82%	8
CA-Qcu	2005329	2.616667			3
CA-Qcu	2005337	2.341667	0.55	12.13%	8
CA-Qcu	2005345	1.75	0.31	15.65%	7
CA-Qcu	2005353	1.991667	0.50	13.78%	8
CA-Qcu	2005361	1.091667			0
CA-Qcu	2006001	1.708333	0.10	16.47%	5
CA-Qcu	2006009	1.883333			2
CA-Qcu	2006017	2.033333	0.23	34.48%	8
CA-Qcu	2006025	2.3	0.64	15.67%	8
CA-Qcu	2006033	2.583333	0.78	9.49%	8
CA-Qcu	2006041	2.175	0.28	19.91%	8
CA-Qcu	2006049	2.683333			4
CA-Qcu	2006057	2.741667	0.84	12.31%	8
CA-Qcu	2006065	4.1	1.65	12.62%	7
CA-Qcu	2006073	4.508333	2.03	10.58%	8
CA-Qcu	2006081	8.041667	2.08	3.55%	8
CA-Qcu	2006089	8.075	5.08	21.08%	8
CA-Qcu	2006097	9.666667	2.99	7.05%	6
CA-Qcu	2006105	6.558333	6.92	1.32%	6
CA-Qcu	2006113	8.308333	11.00	2.73%	8
CA-Qcu	2006121	9.7	12.62	9.19%	6
CA-Qcu	2006129	13.80833	12.59	11.09%	8
CA-Qcu	2006137	14.4	9.65	16.23%	6
CA-Qcu	2006145	15.85833	18.46	13.87%	6
CA-Qcu	2006153	19.51667	16.93	9.04%	8
CA-Qcu	2006161	23.275	16.98	2.67%	6
CA-Qcu	2006169	22.86667	22.05	15.05%	8
CA-Qcu	2006177	21.64167	20.75	16.57%	6
CA-Qcu	2006185	23.94167	21.93	8.88%	6
CA-Qcu	2006193	24.875	23.54	2.20%	5
CA-Qcu	2006201	25.58333			3
CA-Qcu	2006209	26.43333	21.97	6.77%	8
CA-Qcu	2006217	21.93333	19.27	11.69%	8
CA-Qcu	2006225	18.93333	17.32	11.56%	8

CA-Qcu	2006233	15.53333	13.15	15.09%	7
CA-Qcu	2006241	14.91667	13.14	11.79%	7
CA-Qcu	2006249	10.925	11.09	10.44%	8
CA-Qcu	2006257	11.675			3
CA-Qcu	2006265	6.35	9.94	13.47%	5
CA-Qcu	2006273	7.016667	7.49	9.90%	6
CA-Qcu	2006281	5.558333	8.98	18.04%	8
CA-Qcu	2006289	4.358333	5.44	17.42%	8
CA-Qcu	2006297	4.258333			3
CA-Qcu	2006305	3.091667	2.18	6.79%	6
CA-Qcu	2006313	2.941667	2.60	6.25%	5
CA-Qcu	2006321	3.641667	4.04	5.37%	6
CA-Qcu	2006329	3.625	2.34	19.45%	8
CA-Qcu	2006337	2.183333	0.66	14.31%	8
CA-Qcu	2006345	1.775	1.44	6.21%	5
CA-Qcu	2006353	1.883333	0.87	16.02%	8
CA-Qcu	2006361	1.241667			0
CA-Qcu	2007001	2.066667			4
CA-Qcu	2007009	1.95	0.36	13.38%	8
CA-Qcu	2007017	1.875	0.22	17.83%	8
CA-Qcu	2007025	1.625	0.00	394.34%	8
CA-Qcu	2007033	2.133333	0.73	5.59%	8
CA-Qcu	2007041	2.183333	0.57	6.81%	8
CA-Qcu	2007049	2.433333	0.43	8.61%	8
CA-Qcu	2007057	2.9	0.78	6.24%	8
CA-Qcu	2007065	3.433333	0.79	8.15%	8
CA-Qcu	2007073	3.825	2.40	6.49%	8
CA-Qcu	2007081	6.933333	3.52	16.56%	8
CA-Qcu	2007089	7.233333	3.52	11.20%	8
CA-Qcu	2007097	9.725	2.43	9.75%	8
CA-Qcu	2007105	6.925	5.14	3.65%	8
CA-Qcu	2007113	9.941667	9.97	16.24%	8
CA-Qcu	2007121	8.716667	12.37	9.44%	8
CA-Qcu	2007129	10.09167	12.23	7.42%	8
CA-Qcu	2007137	10.39167	14.03	6.00%	8
CA-Qcu	2007145	14.675	14.37	7.32%	8
CA-Qcu	2007153	16.63333			4
CA-Qcu	2007161	22.75	26.72	5.02%	8
CA-Qcu	2007169	21.86667	23.80	7.98%	8
CA-Qcu	2007177	20.9			4
CA-Qcu	2007185	20.05	26.55	21.34%	8
CA-Qcu	2007193	23.25833	29.31	14.45%	7
CA-Qcu	2007201	26.59167	27.49	5.72%	5
CA-Qcu	2007209	25.41667			4

CA-Qcu	2007217	21.25833	27.69	16.75%	8
CA-Qcu	2007225	17.475	19.36	10.50%	5
CA-Qcu	2007233	17.225			4
CA-Qcu	2007241	13.5	18.63	4.49%	5
CA-Qcu	2007249	11.85833			1
CA-Qcu	2007257	10.45833	14.47	3.14%	7
CA-Qcu	2007265	9.566667	13.46	10.10%	8
CA-Qcu	2007273	7.416667	9.04	6.52%	8
CA-Qcu	2007281	4.775			2
CA-Qcu	2007289	5.208333			3
CA-Qcu	2007297	4.133333	8.64	5.78%	5
CA-Qcu	2007305	4.6	5.41	16.42%	8
CA-Qcu	2007313	3.541667	2.85	10.46%	8
CA-Qcu	2007321	3.466667	1.90	6.12%	8
CA-Qcu	2007329	2.108333	0.68	14.63%	8
CA-Qcu	2007337	2.158333	0.25	26.46%	8
CA-Qcu	2007345	1.858333	0.10	54.95%	8
CA-Qcu	2007353	1.883333	1.02	19.82%	8
CA-Qcu	2007361	1.091667			0
CA-Qcu	2008001	1.725	0.39	10.85%	6
CA-Qcu	2008009	1.85	0.69	10.37%	7
CA-Qcu	2008017	1.791667	0.46	12.94%	8
CA-Qcu	2008025	2.291667	0.24	34.98%	8
CA-Qcu	2008033	2.316667	-0.06	52.97%	6
CA-Qcu	2008041	2.391667	0.34	10.58%	8
CA-Qcu	2008049	3.116667	0.96	6.92%	8
CA-Qcu	2008057	2.483333	0.78	14.57%	8
CA-Qcu	2008065	3.516667	1.40	5.07%	8
CA-Qcu	2008073	4.65	2.06	7.36%	8
CA-Qcu	2008081	4.875	2.51	2.13%	8
CA-Qcu	2008089	7.816667	2.94	5.78%	8
CA-Qcu	2008097	8.941667	4.33	6.72%	8
CA-Qcu	2008105	13.3	5.04	4.32%	8
CA-Qcu	2008113	11.475	10.31	10.67%	8
CA-Qcu	2008121	9.391667	14.77	14.43%	8
CA-Qcu	2008129	10.675	18.57	13.64%	8
CA-Qcu	2008137	11.75	15.84	10.58%	6
CA-Qcu	2008145	12.2	15.83	12.12%	6
CA-Qcu	2008153	16.4	20.86	8.95%	6
CA-Qcu	2008161	18.98333	17.38	11.46%	6
CA-Qcu	2008169	21.575			4
CA-Qcu	2008177	24.20833			2
CA-Qcu	2008185	24.51667	22.93	11.57%	8
CA-Qcu	2008193	26.2	25.41	12.46%	7

CA-Qcu	2008201	24.34167			4
CA-Qcu	2008209	21.875			3
CA-Qcu	2008217	21.66667	15.96	8.92%	6
CA-Qcu	2008225	20.76667			1
CA-Qcu	2008233	20.39167	18.00	5.57%	8
CA-Qcu	2008241	19.30833	17.83	10.83%	8
CA-Qcu	2008249	12.23333	13.03	24.50%	8
CA-Qcu	2008257	9.583333	12.83	8.34%	5
CA-Qcu	2008265	11.40833	10.28	7.11%	7
CA-Qcu	2008273	7.033333			4
CA-Qcu	2008281	5.566667			4
CA-Qcu	2008289	4.858333	6.77	17.08%	7
CA-Qcu	2008297	4.133333	4.26	11.92%	6
CA-Qcu	2008305	3.866667	2.24	4.73%	8
CA-Qcu	2008313	3.616667	3.11	14.68%	7
CA-Qcu	2008321	2.716667	2.11	3.70%	7
CA-Qcu	2008329	2.216667	1.06	14.24%	8
CA-Qcu	2008337	2.183333	0.41	19.49%	8
CA-Qcu	2008345	1.941667	0.69	19.70%	7
CA-Qcu	2008353	1.458333	0.13	21.17%	6
CA-Qcu	2008361	1.375			0
CA-Qcu	2009001	1.833333	0.24	18.07%	8
CA-Qcu	2009009	1.541667	0.03	75.60%	8
CA-Qcu	2009017	1.783333	0.07	26.04%	8
CA-Qcu	2009025	1.866667	0.01	290.47%	8
CA-Qcu	2009033	2.141667	0.25	21.15%	8
CA-Qcu	2009041	2.675	0.37	4.39%	5
CA-Qcu	2009049	2.958333	0.88	4.26%	8
CA-Qcu	2009057	3.025	0.49	8.63%	8
CA-Qcu	2009065	4.183333	1.54	13.15%	8
CA-Qcu	2009073	5.608333	3.10	10.77%	8
CA-Qcu	2009081	6.591667	2.04	7.91%	8
CA-Qcu	2009089	7.841667	1.66	15.72%	5
CA-Qcu	2009097	9.216667	3.96	5.57%	8
CA-Qcu	2009105	9.283333	6.10	9.65%	8
CA-Qcu	2009113	13.24167	8.97	13.49%	8
CA-Qcu	2009121	10.41667	12.33	17.09%	8
CA-Qcu	2009129	10.54167	13.65	9.29%	8
CA-Qcu	2009137	10.275	16.03	13.01%	8
CA-Qcu	2009145	11.575	11.55	19.64%	8
CA-Qcu	2009153	11.525	12.47	7.61%	8
CA-Qcu	2009161	17.95	15.40	11.11%	8
CA-Qcu	2009169	22.14167	19.35	3.55%	8
CA-Qcu	2009177	24.475	18.38	10.02%	5

CA-Qcu	2009185	21.76667	22.31	9.02%	5
CA-Qcu	2009193	21.675			0
CA-Qcu	2009201	22.6	16.85	9.37%	7
CA-Qcu	2009209	24.26667	22.05	15.60%	8
CA-Qcu	2009217	21.75833			3
CA-Qcu	2009225	22.14167	18.04	7.77%	6
CA-Qcu	2009233	18.08333			2
CA-Qcu	2009241	15.2			4
CA-Qcu	2009249	15.25			3
CA-Qcu	2009257	12.00833	12.82	8.30%	5
CA-Qcu	2009265	9.108333	9.25	15.79%	6
CA-Qcu	2009273	7.033333			0
CA-Qcu	2009281	5.083333	7.12	6.54%	6
CA-Qcu	2009289	4.516667	3.86	12.21%	7
CA-Qcu	2009297	3.95	2.94	20.90%	8
CA-Qcu	2009305	3.891667			3
CA-Qcu	2009313	3.583333	4.43	20.69%	8
CA-Qcu	2009321	3.258333			3
CA-Qcu	2009329	3.416667			3
CA-Qcu	2009337	2.175	1.05	9.00%	5
CA-Qcu	2009345	1.816667			0
CA-Qcu	2009353	1.825			0
CA-Qcu	2009361	1.325			0
CA-Qcu	2010001	2.141667			0
CA-Qcu	2010009	1.841667			1
CA-Qcu	2010017	2.125	0.34	10.94%	6
CA-Qcu	2010025	1.975	0.30	29.53%	7
CA-Qcu	2010033	2.533333	0.27	7.48%	8
CA-Qcu	2010041	2.758333			4
CA-Qcu	2010049	3.275	1.49	13.27%	5
CA-Qcu	2010057	4.8	2.26	3.70%	8
CA-Qcu	2010065	6.475	2.01	4.63%	8
CA-Qcu	2010073	6.841667	2.50	11.54%	8
CA-Qcu	2010081	6.425	2.45	3.19%	8
CA-Qcu	2010089	8.633333	1.97	14.77%	8
CA-Qcu	2010097	9.466667	7.29	5.44%	7
CA-Qcu	2010105	8.875	8.59	7.58%	8
CA-Qcu	2010113	8.1	9.11	8.71%	8
CA-Qcu	2010121	12.75			3
CA-Qcu	2010129	8.483333	11.67	3.42%	8
CA-Qcu	2010137	13.3	11.41	3.56%	8
CA-Qcu	2010145	17.13333	13.77	9.73%	8
CA-Qcu	2010153	15.14167	11.54	9.18%	8
CA-Qcu	2010161	17.7	11.64	1.87%	8

CA-Qcu	2010169	20.625	14.28	11.06%	8
CA-Qcu	2010177	20.56667			4
CA-Qcu	2010185	26.975			4
CA-Qcu	2010193	25.29167	21.96	13.95%	8
CA-Qcu	2010201	21.78333			4
CA-Qcu	2010209	21.46667	20.70	12.58%	8
CA-Qcu	2010217	20.56667			3
CA-Qcu	2010225	19.41667	16.25	7.66%	5
CA-Qcu	2010233	15.73333	14.80	10.36%	6
CA-Qcu	2010241	18.575	22.09	10.92%	5
CA-Qcu	2010249	11.925			3
CA-Qcu	2010257	10.4			3
CA-Qcu	2010265	8.758333	8.77	17.55%	6
CA-Qcu	2010273	7.166667	8.41	13.70%	6
CA-Qcu	2010281	5.641667	5.88	7.58%	6
CA-Qcu	2010289	4.966667			4
CA-Qcu	2010297	4.758333			4
CA-Qcu	2010305	3.658333	2.43	10.27%	8
CA-Qcu	2010313	3.55	2.34	9.76%	8
CA-Qcu	2010321	2.483333	1.82	14.31%	6
CA-Qcu	2010329	2.158333	0.41	33.52%	8
CA-Qcu	2010337	1.858333			3
CA-Qcu	2010345	1.641667	0.32	16.55%	7
CA-Qcu	2010353	1.6	-0.05	80.23%	7
CA-Qcu	2010361	1.075			0
CA-Na1	2003001	2.6			0
CA-Na1	2003009	2.136364			0
CA-Na1	2003017	1.836364			0
CA-Na1	2003025	2.3			0
CA-Na1	2003033	2.709091			0
CA-Na1	2003041	1.945455			0
CA-Na1	2003049	4.590909			0
CA-Na1	2003057	4.036364			0
CA-Na1	2003065	5.181818			0
CA-Na1	2003073	7.372727			0
CA-Na1	2003081	9			0
CA-Na1	2003089	8.645455			0
CA-Na1	2003097	11.81818			0
CA-Na1	2003105	10.39091			0
CA-Na1	2003113	11.61818			0
CA-Na1	2003121	9.936364			0
CA-Na1	2003129	11.61818			0
CA-Na1	2003137	14.82727			0
CA-Na1	2003145	17.09091			0

CA-Na1	2003153	20.5			0
CA-Na1	2003161	21.52727			0
CA-Na1	2003169	25.09091			0
CA-Na1	2003177	24.94545			0
CA-Na1	2003185	23.72727			0
CA-Na1	2003193	27.18182			0
CA-Na1	2003201	20.57273			0
CA-Na1	2003209	21.60909			0
CA-Na1	2003217	20.5			0
CA-Na1	2003225	23.37273	26.99	7.53%	8
CA-Na1	2003233	20.75455	22.80	3.10%	8
CA-Na1	2003241	18.50909	18.00	1.89%	8
CA-Na1	2003249	19.06364	19.01	4.46%	8
CA-Na1	2003257	19.77273	16.90	8.69%	8
CA-Na1	2003265	12.75455	10.91	9.78%	6
CA-Na1	2003273	8.3	11.39	8.71%	5
CA-Na1	2003281	9.872727	11.06	7.28%	8
CA-Na1	2003289	4.972727			4
CA-Na1	2003297	4.218182			0
CA-Na1	2003305	3.627273			0
CA-Na1	2003313	3.063636			0
CA-Na1	2003321	2.9			0
CA-Na1	2003329	3.054545			1
CA-Na1	2003337	2.272727			0
CA-Na1	2003345	2.054545	7.28	14.91%	5
CA-Na1	2003353	2.172727			3
CA-Na1	2003361	1.872727			0
CA-Na1	2004001	2.563636	4.25	18.91%	5
CA-Na1	2004009	1.581818			1
CA-Na1	2004017	2.145455	5.18	4.37%	5
CA-Na1	2004025	2.072727			0
CA-Na1	2004033	2.745455			4
CA-Na1	2004041	3.109091			0
CA-Na1	2004049	4.718182	1.35	8.80%	8
CA-Na1	2004057	6.281818	1.97	13.43%	8
CA-Na1	2004065	5.827273			1
CA-Na1	2004073	6.381818	3.06	16.95%	5
CA-Na1	2004081	6.745455			4
CA-Na1	2004089	7.681818			4
CA-Na1	2004097	9.545455			4
CA-Na1	2004105	8.372727	10.77	12.38%	6
CA-Na1	2004113	8.345455	11.15	17.31%	8
CA-Na1	2004121	12.97273	17.11	13.25%	5
CA-Na1	2004129	12.42727	15.50	13.59%	8

CA-Na1	2004137	14.83636	16.06	5.52%	8
CA-Na1	2004145	16.71818	14.36	4.91%	8
CA-Na1	2004153	17.1	18.44	1.59%	8
CA-Na1	2004161	25.6	25.16	1.97%	8
CA-Na1	2004169	23.83636	18.15	1.92%	8
CA-Na1	2004177	23.79091	19.10	1.88%	8
CA-Na1	2004185	27.27273	18.35	2.41%	8
CA-Na1	2004193	28.64545	17.85	4.61%	8
CA-Na1	2004201	26.90909	24.50	2.01%	8
CA-Na1	2004209	25.45455	18.40	4.79%	8
CA-Na1	2004217	23.69091	25.76	1.63%	6
CA-Na1	2004225	22.26364	26.67	6.21%	6
CA-Na1	2004233	20.68182	21.12	1.88%	8
CA-Na1	2004241	20.08182	14.38	7.41%	5
CA-Na1	2004249	17.56364			4
CA-Na1	2004257	16.22727			4
CA-Na1	2004265	15.44545			2
CA-Na1	2004273	11.45455	18.68	15.77%	8
CA-Na1	2004281	8.009091			4
CA-Na1	2004289	5.681818	6.78	6.45%	5
CA-Na1	2004297	4.372727	3.74	27.62%	8
CA-Na1	2004305	3.836364			2
CA-Na1	2004313	2.945455	2.56	4.27%	8
CA-Na1	2004321	2.990909	2.42	15.26%	8
CA-Na1	2004329	2.427273	5.59	9.65%	8
CA-Na1	2004337	1.945455	5.80	14.27%	6
CA-Na1	2004345	1.936364	1.74	12.95%	5
CA-Na1	2004353	1.681818	0.80	37.92%	8
CA-Na1	2004361	1.563636			0
CA-Na1	2005001	2.172727			4
CA-Na1	2005009	2.136364	2.80	0.45%	8
CA-Na1	2005017	1.636364	4.71	32.98%	8
CA-Na1	2005025	2.163636	4.58	8.18%	5
CA-Na1	2005033	4.354545	4.94	3.00%	8
CA-Na1	2005041	3.827273	7.98	2.96%	8
CA-Na1	2005049	3.472727	4.53	12.31%	8
CA-Na1	2005057	4.990909	4.58	1.88%	8
CA-Na1	2005065	5.390909	4.54	4.82%	5
CA-Na1	2005073	8.963636	8.80	7.11%	7
CA-Na1	2005081	9.318182			1
CA-Na1	2005089	8.781818	4.61	22.59%	8
CA-Na1	2005097	9.218182	8.21	4.69%	8
CA-Na1	2005105	7.272727	5.37	2.31%	8
CA-Na1	2005113	10.54545	6.94	5.47%	8

CA-Na1	2005121	8.290909	9.92	3.62%	8
CA-Na1	2005129	10.16364	11.72	1.96%	8
CA-Na1	2005137	11.78182	2.50	7.41%	5
CA-Na1	2005145	14.18182	10.56	2.67%	8
CA-Na1	2005153	23.46364	26.85	1.16%	8
CA-Na1	2005161	26	12.06	1.31%	8
CA-Na1	2005169	27.50909	26.53	0.15%	8
CA-Na1	2005177	30.84545	26.19	0.76%	8
CA-Na1	2005185	27.29091	18.98	1.69%	8
CA-Na1	2005193	28.61818	17.93	2.57%	8
CA-Na1	2005201	27.81818	15.01	2.05%	8
CA-Na1	2005209	24.58182	25.65	1.48%	8
CA-Na1	2005217	26.79091	25.90	2.12%	8
CA-Na1	2005225	22.55455	16.87	2.40%	8
CA-Na1	2005233	22.86364	16.75	2.65%	8
CA-Na1	2005241	19.41818	19.43	13.12%	8
CA-Na1	2005249	18.05455	24.81	0.86%	8
CA-Na1	2005257	13.59091	16.51	1.57%	8
CA-Na1	2005265	11.92727	21.36	2.48%	8
CA-Na1	2005273	12.11818	18.36	0.30%	8
CA-Na1	2005281	5.754545	4.84	5.39%	8
CA-Na1	2005289	4.563636	4.91	4.15%	8
CA-Na1	2005297	4.290909	4.66	2.64%	8
CA-Na1	2005305	4.109091	5.50	1.69%	8
CA-Na1	2005313	3.472727	3.75	12.42%	7
CA-Na1	2005321	2.627273	2.39	7.63%	6
CA-Na1	2005329	2.245455	3.10	3.30%	8
CA-Na1	2005337	2.563636	2.99	2.92%	8
CA-Na1	2005345	2.5	1.64	2.65%	8
CA-Na1	2005353	2.172727	0.94	2.09%	8
CA-Na1	2005361	1			0
CA-Qfo	2003001	2.32			0
CA-Qfo	2003009	1.8			0
CA-Qfo	2003017	1.7			0
CA-Qfo	2003025	1.92			0
CA-Qfo	2003033	2.04			0
CA-Qfo	2003041	1.81			0
CA-Qfo	2003049	2.97			0
CA-Qfo	2003057	2.72			0
CA-Qfo	2003065	3.66			0
CA-Qfo	2003073	7.56			0
CA-Qfo	2003081	8.5			0
CA-Qfo	2003089	6.99			0
CA-Qfo	2003097	10.19			0

CA-Qfo	2003105	10.18			0
CA-Qfo	2003113	11.4			0
CA-Qfo	2003121	8.17			0
CA-Qfo	2003129	11.6			0
CA-Qfo	2003137	13.58			0
CA-Qfo	2003145	15.25			0
CA-Qfo	2003153	16.93			0
CA-Qfo	2003161	18.95			0
CA-Qfo	2003169	22.07			0
CA-Qfo	2003177	23.13			0
CA-Qfo	2003185	23.02			0
CA-Qfo	2003193	21.83			0
CA-Qfo	2003201	22.76			0
CA-Qfo	2003209	21.98			0
CA-Qfo	2003217	20.54			0
CA-Qfo	2003225	22.79			0
CA-Qfo	2003233	15.8			0
CA-Qfo	2003241	14.7			4
CA-Qfo	2003249	14.69			4
CA-Qfo	2003257	14.34	13.29	4.72%	5
CA-Qfo	2003265	9.27			0
CA-Qfo	2003273	5.74	5.62	2.84%	6
CA-Qfo	2003281	5.8	5.97	2.62%	8
CA-Qfo	2003289	4.31	3.76	2.72%	8
CA-Qfo	2003297	3.43	2.62	7.60%	6
CA-Qfo	2003305	3.89	4.09	5.59%	8
CA-Qfo	2003313	3.01	4.46	3.31%	8
CA-Qfo	2003321	2.77	2.74	4.72%	8
CA-Qfo	2003329	3.78	4.05	8.98%	8
CA-Qfo	2003337	1.93			0
CA-Qfo	2003345	1.88			0
CA-Qfo	2003353	1.89			0
CA-Qfo	2003361	1.27			0
CA-Qfo	2004001	1.6			0
CA-Qfo	2004009	1.16			0
CA-Qfo	2004017	1.89			2
CA-Qfo	2004025	1.78	1.43	3.33%	8
CA-Qfo	2004033	2.37			4
CA-Qfo	2004041	2.28	1.95	2.54%	8
CA-Qfo	2004049	3.37	2.99	2.57%	6
CA-Qfo	2004057	4.55			3
CA-Qfo	2004065	5.91			0
CA-Qfo	2004073	5.91			4
CA-Qfo	2004081	6.75	4.64	2.13%	8

CA-Qfo	2004089	10.54	3.30	7.49%	8
CA-Qfo	2004097	11.15	3.87	2.82%	8
CA-Qfo	2004105	10.85	5.65	4.05%	8
CA-Qfo	2004113	11.4	6.97	5.85%	8
CA-Qfo	2004121	12.38			0
CA-Qfo	2004129	11.77			1
CA-Qfo	2004137	9.72	10.58	1.76%	8
CA-Qfo	2004145	11.4	10.23	2.19%	5
CA-Qfo	2004153	14.13	14.06	5.44%	6
CA-Qfo	2004161	15.1			4
CA-Qfo	2004169	19.86			1
CA-Qfo	2004177	18.1			0
CA-Qfo	2004185	19.17			2
CA-Qfo	2004193	23.37			2
CA-Qfo	2004201	20.83	14.51	8.74%	8
CA-Qfo	2004209	25.43	18.36	4.38%	6
CA-Qfo	2004217	18.88	10.64	4.65%	8
CA-Qfo	2004225	19.61	14.91	1.82%	8
CA-Qfo	2004233	16.56	10.58	3.52%	8
CA-Qfo	2004241	13.75	9.33	2.24%	8
CA-Qfo	2004249	14.79	9.78	2.03%	8
CA-Qfo	2004257	11.78	9.93	1.65%	8
CA-Qfo	2004265	10.79	7.23	0.98%	8
CA-Qfo	2004273	5.82	8.12	1.64%	8
CA-Qfo	2004281	5.62	4.83	2.06%	8
CA-Qfo	2004289	3.85	4.54	2.63%	8
CA-Qfo	2004297	3.52	1.84	4.28%	8
CA-Qfo	2004305	2.9	3.30	5.50%	8
CA-Qfo	2004313	2.35	3.84	1.62%	5
CA-Qfo	2004321	2.2			0
CA-Qfo	2004329	2.78	1.25	3.46%	6
CA-Qfo	2004337	1.61	0.73	2.92%	8
CA-Qfo	2004345	1.85	0.47	1.81%	5
CA-Qfo	2004353	1.3	0.26	4.37%	6
CA-Qfo	2004361	0.88			0
CA-Qfo	2005001	1.65	0.52	2.78%	8
CA-Qfo	2005009	1.94	0.57	2.67%	8
CA-Qfo	2005017	1.27	0.22	2.97%	8
CA-Qfo	2005025	1.84	0.50	4.36%	8
CA-Qfo	2005033	3.12	0.79	2.90%	6
CA-Qfo	2005041	2.94	0.77	4.80%	6
CA-Qfo	2005049	2.68	0.58	1.91%	8
CA-Qfo	2005057	3.55	0.47	2.90%	8
CA-Qfo	2005065	3.94	0.61	3.83%	7

CA-Qfo	2005073	7.03	0.70	1.97%	6
CA-Qfo	2005081	9.24	0.99	2.80%	8
CA-Qfo	2005089	9.32	1.36	1.81%	7
CA-Qfo	2005097	10.62	2.34	2.14%	8
CA-Qfo	2005105	6.63	2.92	2.70%	8
CA-Qfo	2005113	10.58	3.65	7.14%	8
CA-Qfo	2005121	8.76	7.64	2.31%	8
CA-Qfo	2005129	9.33	6.43	1.26%	8
CA-Qfo	2005137	12.99	9.89	1.04%	8
CA-Qfo	2005145	15.97	12.11	1.72%	8
CA-Qfo	2005153	16.54	11.51	0.86%	8
CA-Qfo	2005161	19.48	12.12	1.35%	8
CA-Qfo	2005169	21.3	14.96	5.29%	8
CA-Qfo	2005177	26.45	18.70	1.64%	5
CA-Qfo	2005185	26.34	16.01	3.46%	8
CA-Qfo	2005193	26.23	17.36	0.86%	8
CA-Qfo	2005201	21.22	13.14	1.59%	8
CA-Qfo	2005209	19.79	14.26	7.95%	8
CA-Qfo	2005217	21.75	15.53	1.66%	8
CA-Qfo	2005225	18.35	10.47	1.17%	8
CA-Qfo	2005233	17.84	12.97	1.93%	8
CA-Qfo	2005241	15.91	9.97	1.93%	8
CA-Qfo	2005249	14.19	10.95	2.34%	8
CA-Qfo	2005257	11.61	8.66	2.47%	8
CA-Qfo	2005265	6.43	6.47	2.96%	8
CA-Qfo	2005273	6.97	6.52	2.54%	8
CA-Qfo	2005281	4.47	3.57	2.58%	8
CA-Qfo	2005289	4.67	3.27	5.49%	8
CA-Qfo	2005297	3.32	1.70	2.84%	8
CA-Qfo	2005305	3.56	3.33	5.52%	8
CA-Qfo	2005313	3.71	3.69	3.69%	8
CA-Qfo	2005321	3.84	1.66	3.95%	8
CA-Qfo	2005329	2.91	0.37	5.90%	5
CA-Qfo	2005337	2.33	1.29	3.91%	8
CA-Qfo	2005345	1.79	0.60	4.71%	8
CA-Qfo	2005353	2.09	0.90	3.92%	8
CA-Qfo	2005361	1.19			0
CA-Qfo	2006001	1.76	0.75	3.14%	8
CA-Qfo	2006009	1.85	0.71	8.39%	6
CA-Qfo	2006017	1.99	1.15	4.38%	8
CA-Qfo	2006025	2.42	1.60	2.96%	8
CA-Qfo	2006033	2.68	1.72	8.15%	6
CA-Qfo	2006041	2.51	1.47	4.99%	8
CA-Qfo	2006049	3.06	1.46	1.73%	8

CA-Qfo	2006057	3	1.20	3.97%	5
CA-Qfo	2006065	5.1	1.95	5.07%	8
CA-Qfo	2006073	5.56	3.00	2.76%	8
CA-Qfo	2006081	9.9	2.15	2.73%	8
CA-Qfo	2006089	9.37	3.83	2.38%	8
CA-Qfo	2006097	11.18	4.19	3.42%	8
CA-Qfo	2006105	6.97	4.29	3.72%	8
CA-Qfo	2006113	8.03	3.59	4.86%	8
CA-Qfo	2006121	9.33	5.06	1.81%	8
CA-Qfo	2006129	14.33	13.01	3.04%	8
CA-Qfo	2006137	13.74	10.21	3.65%	8
CA-Qfo	2006145	15.91	14.10	2.66%	8
CA-Qfo	2006153	17.81	15.11	1.69%	8
CA-Qfo	2006161	20.41	11.60	3.20%	8
CA-Qfo	2006169	20.92	17.94	1.44%	8
CA-Qfo	2006177	21.03	13.95	1.56%	8
CA-Qfo	2006185	23.48	15.66	0.94%	8
CA-Qfo	2006193	22.68	20.46	3.90%	8
CA-Qfo	2006201	22.48	17.82	1.42%	8
CA-Qfo	2006209	21.51	17.67	1.48%	8
CA-Qfo	2006217	19.12	13.14	2.41%	8
CA-Qfo	2006225	16.96	12.01	1.49%	8
CA-Qfo	2006233	14.03	11.28	1.65%	8
CA-Qfo	2006241	14.32	9.87	1.23%	8
CA-Qfo	2006249	9.94	8.53	1.25%	8
CA-Qfo	2006257	10.77	6.71	1.43%	8
CA-Qfo	2006265	5.49	6.23	2.02%	8
CA-Qfo	2006273	6.52	5.05	2.16%	8
CA-Qfo	2006281	5.64	5.24	1.47%	8
CA-Qfo	2006289	4.35	2.58	2.33%	8
CA-Qfo	2006297	3.89	2.48	6.69%	8
CA-Qfo	2006305	2.72	3.77	3.60%	8
CA-Qfo	2006313	2.82	1.52	5.06%	8
CA-Qfo	2006321	3.97	1.85	3.32%	8
CA-Qfo	2006329	3.77	1.36	6.87%	8
CA-Qfo	2006337	2.38	0.90	4.08%	8
CA-Qfo	2006345	1.83	1.41	5.94%	8
CA-Qfo	2006353	1.89	1.30	4.85%	8
CA-Qfo	2006361	1.18			0
CA-Qfo	2007001	2.15	1.36	6.67%	8
CA-Qfo	2007009	1.99	0.92	3.71%	8
CA-Qfo	2007017	1.91	0.80	8.22%	8
CA-Qfo	2007025	1.66	0.53	2.95%	8
CA-Qfo	2007033	2.24	1.23	2.62%	8

CA-Qfo	2007041	2.36	1.05	2.77%	8
CA-Qfo	2007049	2.66	0.97	2.48%	8
CA-Qfo	2007057	3.46	1.40	1.90%	8
CA-Qfo	2007065	3.91	1.19	3.48%	8
CA-Qfo	2007073	4.46	2.10	1.91%	8
CA-Qfo	2007081	8.04	1.96	3.62%	8
CA-Qfo	2007089	8.28	3.99	3.13%	8
CA-Qfo	2007097	10.44	3.48	2.31%	8
CA-Qfo	2007105	7.54	3.05	2.53%	8
CA-Qfo	2007113	9.2	4.48	2.35%	8
CA-Qfo	2007121	8.79	5.80	2.45%	8
CA-Qfo	2007129	10.16	8.66	1.62%	8
CA-Qfo	2007137	11.19	9.60	1.36%	8
CA-Qfo	2007145	14.48	11.15	1.29%	8
CA-Qfo	2007153	15.25	15.23	6.89%	8
CA-Qfo	2007161	18.18	16.95	1.81%	8
CA-Qfo	2007169	18.91	11.92	1.15%	8
CA-Qfo	2007177	19.07	11.58	2.43%	8
CA-Qfo	2007185	18.59	14.00	1.11%	8
CA-Qfo	2007193	20.78	15.97	1.05%	8
CA-Qfo	2007201	23.36	16.81	1.35%	8
CA-Qfo	2007209	21.89	15.12	1.13%	8
CA-Qfo	2007217	19.48	14.42	1.54%	8
CA-Qfo	2007225	16.26	9.82	11.81%	8
CA-Qfo	2007233	16.04	11.20	2.22%	8
CA-Qfo	2007241	12.3	9.75	1.62%	8
CA-Qfo	2007249	10.35	8.47	4.15%	8
CA-Qfo	2007257	9.65	9.66	1.33%	8
CA-Qfo	2007265	8.8	7.82	1.13%	8
CA-Qfo	2007273	7.17	6.21	2.02%	8
CA-Qfo	2007281	4.22	2.96	6.06%	8
CA-Qfo	2007289	4.71	3.78	2.45%	8
CA-Qfo	2007297	3.46	5.04	2.24%	8
CA-Qfo	2007305	4.08	2.75	3.91%	8
CA-Qfo	2007313	3.23	2.59	2.83%	8
CA-Qfo	2007321	3.12	2.59	3.30%	8
CA-Qfo	2007329	2	1.69	2.77%	8
CA-Qfo	2007337	2.09	1.31	3.17%	8
CA-Qfo	2007345	1.8	0.67	3.86%	8
CA-Qfo	2007353	1.95	0.95	6.02%	8
CA-Qfo	2007361	1.1			0
CA-Qfo	2008001	1.89	0.44	6.22%	8
CA-Qfo	2008009	1.87	1.32	2.23%	8
CA-Qfo	2008017	1.77			3

CA-Qfo	2008025	2.46			1
CA-Qfo	2008033	2.5	0.91	4.22%	8
CA-Qfo	2008041	2.53	1.31	2.27%	8
CA-Qfo	2008049	3.41	1.31	3.42%	8
CA-Qfo	2008057	2.72	0.58	4.65%	7
CA-Qfo	2008065	3.94	2.02	6.40%	7
CA-Qfo	2008073	6.48	1.96	5.01%	8
CA-Qfo	2008081	5.54	1.90	2.03%	8
CA-Qfo	2008089	9.77	3.09	2.15%	8
CA-Qfo	2008097	10.19	2.62	3.03%	8
CA-Qfo	2008105	13.5	2.56	1.47%	8
CA-Qfo	2008113	10.96	4.63	2.61%	8
CA-Qfo	2008121	9.14	6.11	2.00%	8
CA-Qfo	2008129	10.73	9.58	2.95%	8
CA-Qfo	2008137	11.15	8.07	1.73%	8
CA-Qfo	2008145	11.75	8.05	1.25%	8
CA-Qfo	2008153	14.48	13.02	1.80%	8
CA-Qfo	2008161	16.38	12.63	7.51%	8
CA-Qfo	2008169	19.92	13.81	8.18%	8
CA-Qfo	2008177	22.04	16.22	1.83%	8
CA-Qfo	2008185	22.36	12.62	0.75%	8
CA-Qfo	2008193	22.89	17.50	1.83%	8
CA-Qfo	2008201	18.66	13.15	3.72%	8
CA-Qfo	2008209	18.66	12.46	1.79%	8
CA-Qfo	2008217	18.79	13.55	2.74%	8
CA-Qfo	2008225	19.81	10.97	2.97%	5
CA-Qfo	2008233	18.64	11.94	1.37%	8
CA-Qfo	2008241	17.58	12.38	2.73%	8
CA-Qfo	2008249	10.85	6.33	1.16%	8
CA-Qfo	2008257	9.13	7.33	2.90%	8
CA-Qfo	2008265	9.85	6.20	1.60%	8
CA-Qfo	2008273	6.29	3.79	2.24%	8
CA-Qfo	2008281	5.16	4.12	2.13%	8
CA-Qfo	2008289	4.62	4.56	2.12%	8
CA-Qfo	2008297	4.04	2.67	3.58%	8
CA-Qfo	2008305	3.58	2.08	3.96%	8
CA-Qfo	2008313	3.5	1.90	3.44%	8
CA-Qfo	2008321	2.71	2.04	3.20%	8
CA-Qfo	2008329	2.21	1.03	5.12%	8
CA-Qfo	2008337	2.1	1.01	1.82%	6
CA-Qfo	2008345	1.86	0.77	5.02%	8
CA-Qfo	2008353	1.43	0.56	2.44%	6
CA-Qfo	2008361	1.36			0
CA-Qfo	2009001	1.85	0.50	5.32%	8

CA-Qfo	2009009	1.57	0.45	10.16%	8
CA-Qfo	2009017	1.81	0.57	3.79%	8
CA-Qfo	2009025	1.97	0.61	4.33%	8
CA-Qfo	2009033	2.21	1.28	1.65%	5
CA-Qfo	2009041	2.71	0.99	1.48%	8
CA-Qfo	2009049	3.23	1.54	3.54%	7
CA-Qfo	2009057	3.42	1.14	2.66%	8
CA-Qfo	2009065	5.28	2.82	6.01%	8
CA-Qfo	2009073	7.41	2.19	5.72%	8
CA-Qfo	2009081	8.04	2.04	3.89%	8
CA-Qfo	2009089	8.95	2.35	1.94%	7
CA-Qfo	2009097	10.46	2.61	2.09%	8
CA-Qfo	2009105	10.71	2.98	1.52%	8
CA-Qfo	2009113	12.83	4.06	2.05%	8
CA-Qfo	2009121	10.06	6.75	1.54%	8
CA-Qfo	2009129	10.33	9.41	2.21%	8
CA-Qfo	2009137	10.39	10.90	0.73%	8
CA-Qfo	2009145	10.85	9.14	0.59%	8
CA-Qfo	2009153	11.56	11.91	1.47%	8
CA-Qfo	2009161	15.58	13.26	1.83%	8
CA-Qfo	2009169	20.05	17.00	4.87%	8
CA-Qfo	2009177	22.43	14.37	1.48%	8
CA-Qfo	2009185	17.83	15.36	2.07%	8
CA-Qfo	2009193	19.23	14.17	3.04%	8
CA-Qfo	2009201	18.84	14.74	2.47%	8
CA-Qfo	2009209	22.07	15.04	2.68%	8
CA-Qfo	2009217	18.89	16.05	2.14%	8
CA-Qfo	2009225	19.41	13.68	1.36%	8
CA-Qfo	2009233	15.66	11.92	4.65%	8
CA-Qfo	2009241	13.53	10.06	1.05%	8
CA-Qfo	2009249	12.77	9.86	1.75%	8
CA-Qfo	2009257	10.65	8.58	1.26%	8
CA-Qfo	2009265	8.66	5.68	1.51%	8
CA-Qfo	2009273	6.55	5.85	1.75%	8
CA-Qfo	2009281	4.97	5.47	2.24%	8
CA-Qfo	2009289	4.18	2.46	3.99%	8
CA-Qfo	2009297	3.68	2.94	5.61%	8
CA-Qfo	2009305	3.59	3.62	2.36%	8
CA-Qfo	2009313	3.38	2.84	4.59%	8
CA-Qfo	2009321	3.11	1.38	4.20%	8
CA-Qfo	2009329	3.19	1.81	2.84%	8
CA-Qfo	2009337	2.15	2.25	1.77%	8
CA-Qfo	2009345	1.74	1.19	2.27%	8
CA-Qfo	2009353	1.92			4

CA-Qfo	2009361	1.37			0
CA-Qfo	2010001	2.25	1.08	9.68%	7
CA-Qfo	2010009	1.84	1.02	3.94%	8
CA-Qfo	2010017	2.07	1.24	2.63%	8
CA-Qfo	2010025	1.87	1.58	10.08%	6
CA-Qfo	2010033	2.5	1.66	3.84%	8
CA-Qfo	2010041	2.83	2.18	2.37%	7
CA-Qfo	2010049	3.71	4.08	1.97%	8
CA-Qfo	2010057	6.03	5.05	1.22%	5
CA-Qfo	2010065	7.78	1.68	2.81%	6
CA-Qfo	2010073	8.01	2.23	2.98%	8
CA-Qfo	2010081	7.28	2.64	2.93%	8
CA-Qfo	2010089	9.19	1.78	6.60%	8
CA-Qfo	2010097	8.49	4.41	1.85%	8
CA-Qfo	2010105	8.65	4.93	5.67%	8
CA-Qfo	2010113	7.92	4.85	1.43%	8
CA-Qfo	2010121	12.03	6.56	3.71%	7
CA-Qfo	2010129	8.09	5.65	0.90%	8
CA-Qfo	2010137	12.08	9.73	3.42%	8
CA-Qfo	2010145	15.12	11.36	3.02%	8
CA-Qfo	2010153	13.33	11.07	1.28%	8
CA-Qfo	2010161	16.6	10.18	1.53%	8
CA-Qfo	2010169	19.36	11.00	1.44%	8
CA-Qfo	2010177	18.86	10.68	6.19%	8
CA-Qfo	2010185	23.9			0
CA-Qfo	2010193	23.57	17.24	2.41%	7
CA-Qfo	2010201	20.62	12.87	1.28%	8
CA-Qfo	2010209	20.24	14.65	2.16%	8
CA-Qfo	2010217	18.12	15.13	3.56%	8
CA-Qfo	2010225	17.36			3
CA-Qfo	2010233	14.09	11.44	2.56%	8
CA-Qfo	2010241	16.63			2
CA-Qfo	2010249	11.02			0
CA-Qfo	2010257	9.68			0
CA-Qfo	2010265	8.12			0
CA-Qfo	2010273	6.86			0
CA-Qfo	2010281	5.53			0
CA-Qfo	2010289	4.54			4
CA-Qfo	2010297	4.19	2.46	5.36%	7
CA-Qfo	2010305	3.6	1.92	2.29%	8
CA-Qfo	2010313	3.47	2.22	5.26%	8
CA-Qfo	2010321	3.27			0
CA-Qfo	2010329	2.73			0
CA-Qfo	2010337	2.17			1

CA-Qfo	2010345	2.02	1.16	3.76%	8
CA-Qfo	2010353	1.85	0.37	3.28%	5
CA-Qfo	2010361	1.21			0
CA-SJ3	2004001	1.84			0
CA-SJ3	2004009	1.75			0
CA-SJ3	2004017	1.25			0
CA-SJ3	2004025	0.76			0
CA-SJ3	2004033	1.71			0
CA-SJ3	2004041	2.01			0
CA-SJ3	2004049	2.95			0
CA-SJ3	2004057	3.18			0
CA-SJ3	2004065	4.09			0
CA-SJ3	2004073	4.39			0
CA-SJ3	2004081	7.93			0
CA-SJ3	2004089	4.52			0
CA-SJ3	2004097	4.1			0
CA-SJ3	2004105	6.24			0
CA-SJ3	2004113	8.08			0
CA-SJ3	2004121	6.72	3.15	2.08%	5
CA-SJ3	2004129	7.35	5.83	2.63%	8
CA-SJ3	2004137	8.28	7.12	1.90%	8
CA-SJ3	2004145	9.37	6.43	2.55%	8
CA-SJ3	2004153	14.99	10.76	1.96%	8
CA-SJ3	2004161	14.64	9.69	2.24%	8
CA-SJ3	2004169	13.73	12.13	2.45%	8
CA-SJ3	2004177	19.37	10.45	2.12%	8
CA-SJ3	2004185	20.91	11.84	4.30%	8
CA-SJ3	2004193	21.81	15.77	1.56%	8
CA-SJ3	2004201	23.04	15.36	2.02%	8
CA-SJ3	2004209	19.53	12.14	2.08%	8
CA-SJ3	2004217	18.44	10.31	1.68%	8
CA-SJ3	2004225	17.65	13.16	5.34%	8
CA-SJ3	2004233	12.09	9.28	1.55%	8
CA-SJ3	2004241	11.4	7.25	2.69%	8
CA-SJ3	2004249	8.98	6.21	2.56%	8
CA-SJ3	2004257	9.68	5.81	2.24%	8
CA-SJ3	2004265	6.75	8.69	1.74%	8
CA-SJ3	2004273	4.5	4.41	1.03%	8
CA-SJ3	2004281	4.83	3.94	2.12%	8
CA-SJ3	2004289	3.29	1.07	6.13%	8
CA-SJ3	2004297	2.89	1.08	9.56%	8
CA-SJ3	2004305	3.02	0.72	3.72%	8
CA-SJ3	2004313	3.21	0.60	5.24%	8
CA-SJ3	2004321	3.52	0.81	4.16%	8

CA-SJ3	2004329	2.48	0.56	5.89%	8
CA-SJ3	2004337	1.4	0.32	3.85%	8
CA-SJ3	2004345	1.51	0.80	2.51%	8
CA-SJ3	2004353	0.99	0.24	3.29%	8
CA-SJ3	2004361	1.23			0
CA-SJ3	2005001	1.4	0.42	2.44%	8
CA-SJ3	2005009	1.02	0.21	6.73%	8
CA-SJ3	2005017	1.49	0.43	2.19%	8
CA-SJ3	2005025	1.31	0.82	4.37%	8
CA-SJ3	2005033	1.43	0.87	2.78%	8
CA-SJ3	2005041	2.27	0.40	8.86%	8
CA-SJ3	2005049	2.63	0.35	4.83%	8
CA-SJ3	2005057	4.63	0.52	4.60%	8
CA-SJ3	2005065	4.56	1.26	7.97%	8
CA-SJ3	2005073	4.16	0.69	3.75%	8
CA-SJ3	2005081	7.29	1.47	3.69%	8
CA-SJ3	2005089	4.85	1.74	3.06%	8
CA-SJ3	2005097	8.66	1.70	5.52%	8
CA-SJ3	2005105	7.33	4.53	0.94%	8
CA-SJ3	2005113	6.99	3.28	2.50%	8
CA-SJ3	2005121	7.59	5.17	0.91%	8
CA-SJ3	2005129	7.03	4.69	0.53%	8
CA-SJ3	2005137	13.62	8.16	2.90%	8
CA-SJ3	2005145	14.17	9.00	1.34%	8
CA-SJ3	2005153	14.07	6.67	1.78%	8
CA-SJ3	2005161	15.53	11.98	1.37%	8
CA-SJ3	2005169	21.33	12.34	1.25%	8
CA-SJ3	2005177	20.57	13.81	1.49%	8
CA-SJ3	2005185	22.07	21.65	1.20%	8
CA-SJ3	2005193	21.02	16.18	3.15%	8
CA-SJ3	2005201	20.41	11.69	1.07%	8
CA-SJ3	2005209	17.95	9.81	2.42%	8
CA-SJ3	2005217	16.8	7.45	1.88%	8
CA-SJ3	2005225	14.65	5.62	3.98%	8
CA-SJ3	2005233	16.32	9.06	1.46%	8
CA-SJ3	2005241	13.28	9.22	2.82%	8
CA-SJ3	2005249	12.27	9.01	1.62%	8
CA-SJ3	2005257	7.52	6.89	1.70%	8
CA-SJ3	2005265	5.88	6.46	1.81%	8
CA-SJ3	2005273	4.41	2.22	3.82%	8
CA-SJ3	2005281	5	2.89	4.32%	8
CA-SJ3	2005289	3.04	1.02	11.31%	8
CA-SJ3	2005297	3.2	1.33	3.01%	8
CA-SJ3	2005305	2.8	0.26	14.77%	8

CA-SJ3	2005313	2.96	0.75	3.58%	8
CA-SJ3	2005321	3.37	0.83	6.75%	8
CA-SJ3	2005329	3.03	0.50	4.68%	8
CA-SJ3	2005337	2.68	0.39	4.62%	8
CA-SJ3	2005345	1.9	0.54	8.20%	8
CA-SJ3	2005353	1.61	0.30	13.99%	8
CA-SJ3	2005361	0.9			0
CA-SJ3	2006001	1.58	0.22	34.67%	8
CA-SJ3	2006009	1.64	0.21	31.32%	8
CA-SJ3	2006017	1.63	0.57	4.13%	8
CA-SJ3	2006025	1.61	0.35	10.24%	8
CA-SJ3	2006033	2.05	0.47	4.19%	8
CA-SJ3	2006041	1.7	0.67	5.57%	8
CA-SJ3	2006049	2.39	0.73	4.73%	8
CA-SJ3	2006057	2.83	0.84	4.30%	8
CA-SJ3	2006065	4.24	1.63	3.28%	8
CA-SJ3	2006073	5.04	1.31	5.50%	8
CA-SJ3	2006081	8.88	1.19	3.86%	8
CA-SJ3	2006089	5.98	1.66	3.00%	8
CA-SJ3	2006097	6.58	2.59	2.17%	8
CA-SJ3	2006105	8.68	4.98	2.26%	8
CA-SJ3	2006113	9.21			4
CA-SJ3	2006121	10.26	9.11	2.68%	5
CA-SJ3	2006129	10.97			0
CA-SJ3	2006137	14.17	7.72	3.74%	8
CA-SJ3	2006145	16	9.81	9.93%	8
CA-SJ3	2006153	17.39	12.57	1.93%	6
CA-SJ3	2006161	19.15			4
CA-SJ3	2006169	24.33	16.88	3.93%	5
CA-SJ3	2006177	27.18	14.57	1.61%	8
CA-SJ3	2006185	24.28	12.22	8.39%	8
CA-SJ3	2006193	23.59			0
CA-SJ3	2006201	20.75	11.13	4.78%	8
CA-SJ3	2006209	21.08	10.26	3.96%	8
CA-SJ3	2006217	19.62	11.96	7.15%	8
CA-SJ3	2006225	19.51	11.35	1.55%	8
CA-SJ3	2006233	17.58	5.48	2.25%	8
CA-SJ3	2006241	14.89	6.67	6.72%	8
CA-SJ3	2006249	11.57	4.81	2.69%	8
CA-SJ3	2006257	6.2	3.32	1.61%	8
CA-SJ3	2006265	7.39	3.99	2.83%	8
CA-SJ3	2006273	5.87	3.98	16.03%	8
CA-SJ3	2006281	3.47	2.07	16.57%	8
CA-SJ3	2006289	2.49	0.50	8.08%	6

CA-SJ3	2006297	2.85	0.99	5.63%	8
CA-SJ3	2006305	2.9	0.41	10.39%	8
CA-SJ3	2006313	2.09	0.61	8.26%	6
CA-SJ3	2006321	1.59	0.36	13.20%	8
CA-SJ3	2006329	1.46	0.37	17.21%	8
CA-SJ3	2006337	1.75	0.53	4.43%	8
CA-SJ3	2006345	1.68	0.37	22.29%	8
CA-SJ3	2006353	2.42	0.78	5.00%	8
CA-SJ3	2006361	1.1			0

Table 4: Displays the ET estimations and measurements for all 8-day periods analyzed in 2008. The "Days of Flux Tower Measurement" column represents the number of days in the 8-day period for which there were 48 LE measurements after gap-filling. The error is the same for all 8-day periods because error is assessed on a yearly basis

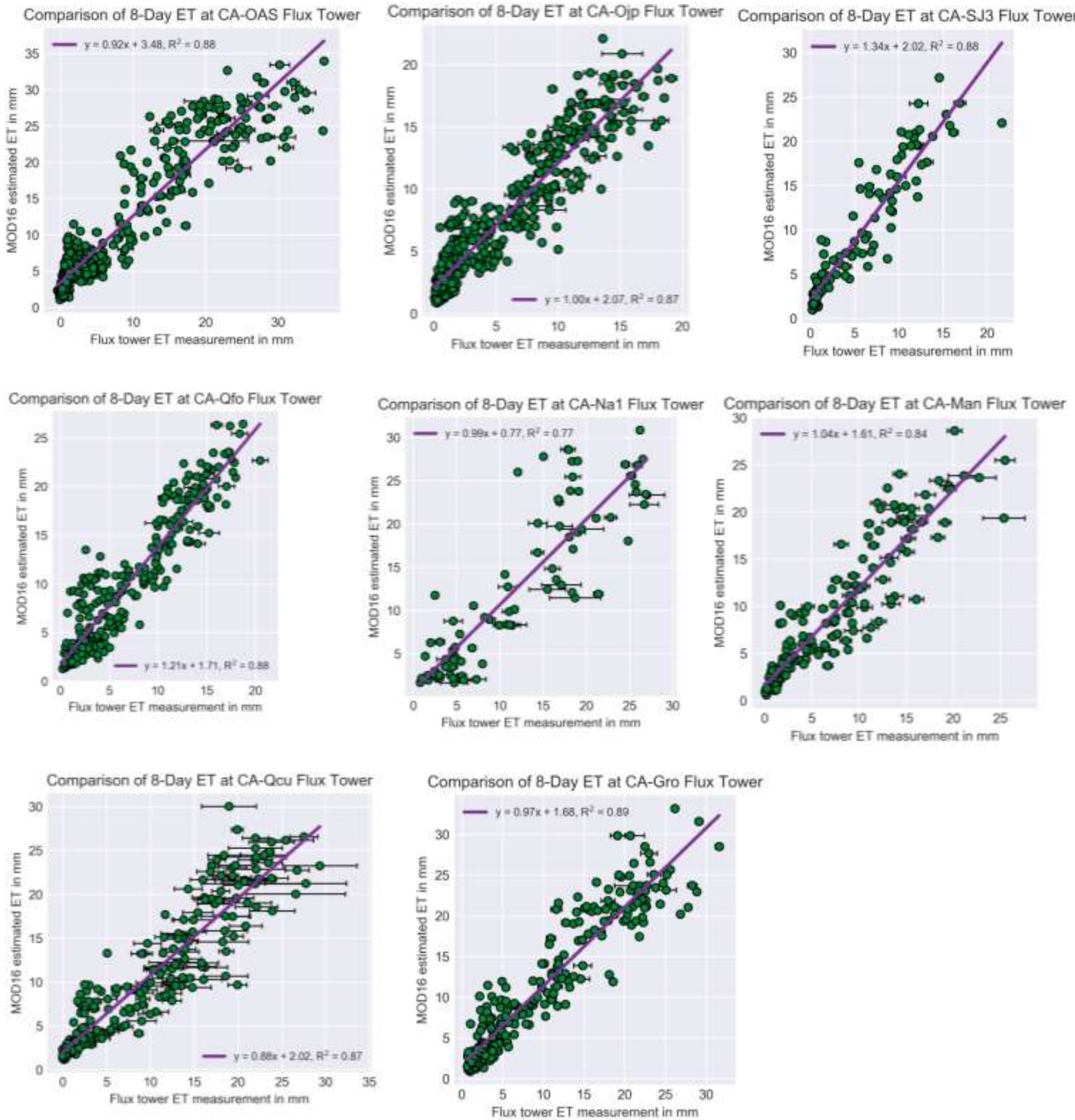


Figure 12: Linear regression between MOD16 ET, flux tower ET for each tower that was studied