Impacts of Climate Change: Distribution of Precipitation

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Introduction

- Affected by the pattern of the global winds, the distribution of land and sea, and the presence of mountains
- Most abundant where air rises, and least abundant where it sinks. For example, precipitation is greater near oceans and lakes, and in higher elevations.
- The wettest areas on Earth are in the "rising air" zones
- The driest areas are in the "descending air" zone.
- When air encounters a hill, it is forced to rise. Because rising air cools and condenses, precipitation is heaviest on the upwind side of a mountain, where the air is rising.(2)

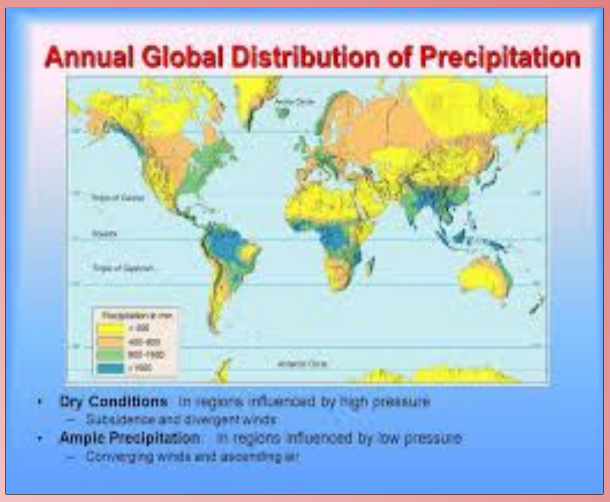

Figure 1: Annual Global Distribution of precipitation

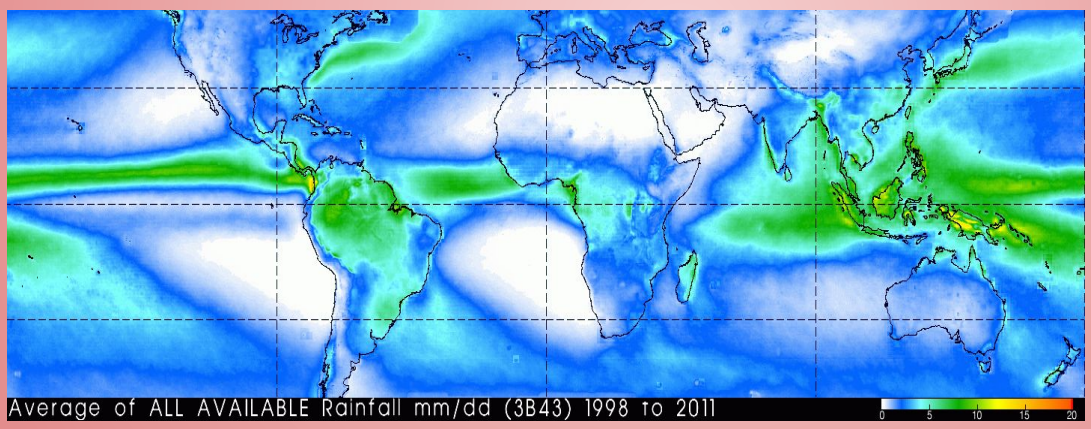

Figure 2: Average rainfall from 1998-2011. The most rainfall seems to occur around the equator.

How Current Global Change is Making This Worse

The total annual precipitation worldwide has increased due to global warming. On average per decade, precipitation has increased by about 0.08 inches (1). Human induced global warming has caused a northward shift in the thermal equator (as seen in Figure 2). This could cause areas up north to become wetter and receive more rainfall, or receive dry spells with little to no rainfall than they had previously had before the onset of anthropogenic induced global warming. In all, the tropics will likely become wetter and the subtropics will become drier (1).

CPSG101 Science & Global Change First Year Colloquium II, Spring 2020
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Figure 3: increase of precipitation causing extreme runoffs, and infiltration process is killing the plants

Figure 4: flooding in Venice, same could happen to other coastal areas.

How will this change impact humans &/or wildlife in the near future

With more precipitation happening around the world, which in the near future could be causing the loss of agriculture. For example, low pressure area will consists more rainy weather while excessive run offs could causing flooding, erode streambanks, and damage roads. It can also saturated soils in low areas and killed upland plants (4). The global water cycle will be coming in shorten period and causing the cities along the coast in further danger of tsunami or rainy weather. (4)&(5)

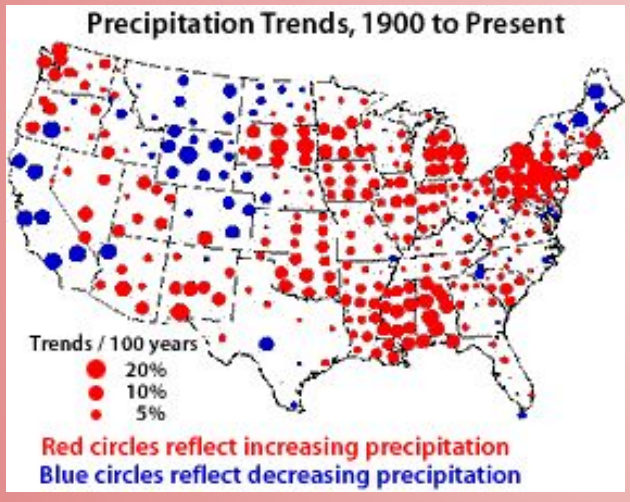

Figure 5: Precipitation trends from 1900 to now, the red shows increasing precipitation while the blue shows decreasing precipitation

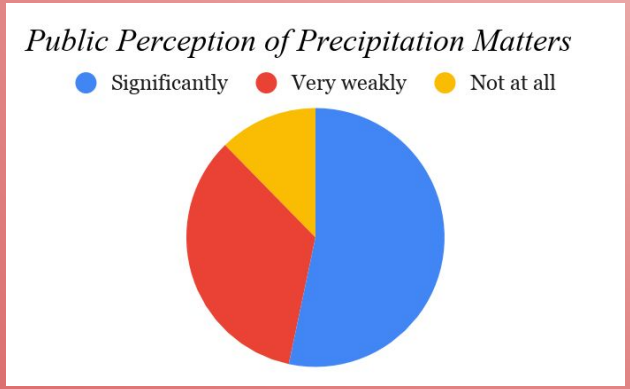

Figure 6: Data from public survey about whether distribution of precipitation matters for climate change

Explanatory Text

- ➔ The assessment of changes in precipitation time-series is a challenge because of the issues related to length and quality of the data and changing monitoring networks and lack of metadata in many situations.
- ➔ Changes in precipitation and streamflow are a common prediction for climate change across biomes, but stream flows in the majority of rivers have already been greatly modified by anthropogenic activities, and many rivers no longer have natural flow regimes.
- ➔ With temperatures expecting to rise with time, higher temperature means greater evaporation and surface drying, potentially contributing to the intensity and duration of drought.
- ➔ This increased moisture will not fall evenly across the planet, some areas will see increased precipitation, while other areas are expected to see less due to shifting weather patterns and other factors. (3)

References

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