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Data gaps bedevil research into Arctic water cycle

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FAIRBANKS -- The unpredictability of human nature is one of the uncertainties associated with studying the Arctic water cycle.

According to projections from the International Panel on Climate Change by 2080 through 2099, the Earth will have warmed several degrees, with the largest change happening in the Arctic.

But Jessica Cherry, a University of Alaska Fairbanks researcher, said models predicting the behavior of the Arctic water cycle in the future are based on assumptions about the socio-economic status of society. Society's choices when it comes to environmental concerns such as emission levels are unknown and therefore the models which are based on the prediction will include some uncertainty.

Cherry also said present research includes a number of uncertainties that must be accounted for.

One source of uncertainty stems from stem from a sparse and sometimes biased observation network.

"We all know it can be raining in one part of town and not in the other," Cherry said.

In the past, the network was also less developed, which means there is a limited amount of data to do comparisons with.

Even if there are stations set up to monitor the water cycle, it doesn't mean the researchers are set. Cherry said animals wrecking stations are a common occurrence.

Scientists also have to deal with precipitation gauges, which Cherry said are inherently

flawed in their design and can succumb to the cold Arctic temperatures.

In addition to all of these problems, Cherry said there are weather anomalies such as La Nina or El Nino, which can throw off data.

Attempts to correct the data are made but even those have an amount of uncertainty.

Cherry said the water cycle should be studied even with all of these questions of uncertainty surrounding the data because there is a need for information about precipitation, snow, lake or reservoir level, runoff and evaporation for management decisions. Also, dependable sources of clean water are becoming more rare in the world. In addition, the information can be used to determine if the water cycle with a new climate regime.

Cherry also presented possible solutions to curb the amount of uncertainty in the water cycle data. Sophisticated technology can alleviate the problem but advanced technology can be a double-edged sword. Scientists can get more advanced data but there is a possibility they will also have to deal with new technological problems.

Improvement of the observation networks and better sensor technology for colder temperatures are two other solutions to cut down on the amount of uncertainty.

Not every solution has to do with better technology though. Cherry said education of the general public about how to apply the water cycle information can have an effect on decision making and policies.

Even with all of the precautions, the water cycle like most things cannot be totally certain.

“We can’t escape uncertainty, it’s all around us,” Cherry said.