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Assesment of climate change using methods of mathematic statistics and theory of probability

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In simple terms: “Climate“ is the average of “weather”. The Earth’s weather system is a complex machine composed of coupled sub-systems (ocean, air, land, ice and the biosphere) between which energy are exchanged.

The understanding and study of climate change does not only rely on the understanding of the physics of climate change but is linked to the following question: “How we can detect change in a system that is changing all the time under its own volition”? What is even the meaning of “change” in such a situation?

The concept of “change” we should transform into the concept of “significant and long-term” then this re-phrasing allows for a definition in mathematical terms. Significant change in a system becomes a measure of how large an observed change is in terms of the variability one would see under “normal” conditions.

Example could be the analyses of the yearly temperature of the air and precipitations, like in this paper.

A large amount of data are selected as representing the “before“ case (change) and another set of data are selected as being the “after” case and then the average in these two cases are compared. These comparisons are in the form of “hypothesis tests” in which one tests whether the hypothesis that there has been no change can be rejected. Both parameter and nonparametric statistic methods are used in the theory of mathematic statistic.

The most indicative changeable which show global change is an average., standard deviation and probability function distribution on examined time series. Examined

meteorological series are taken like haphazard process so we can mathematic statistic applied.