How to determine the current state of the climate?

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Determining the current state of the climate is a core task of climate monitoring and climate information in every climate service department. Traditionally, averages over a recent 30-year period, so called climate normals, are used for this purpose. However, the classic concept of climate normals is based on the assumption of a stationary climate. Due to climate change, this stationarity assumption is violated for some variables such as temperature and climate normals can deviate considerably from the true current state of the climate. Since 2012, the World Meteorological Organization recommends updating climate normals more frequently, every 10 years instead of every 30 years. The scientific literature however shows that further alternative approaches are desirable and can potentially help users make better informed decisions. MeteoSwiss is currently examining the possibilities of introducing supplementary estimates that better describe the current state of the climate. In this presentation we discuss statistical properties of a series of alternative estimates such as shorter averaging periods, different linear trend fits and applying smoothed curve fitting (e.g. cubic splines, kernel regression). The analysis is applied for the testbed of Switzerland using a perfect model framework for combined observational/climate scenario temperature series. The results allow to determine if supplementary estimates are superior to the classical normal or not and are a central component for deciding whether alternative to the classical normals should be introduced. Another important goal of this presentation is to initiate a discussion among climate service providers about their thoughts, experiences and approaches in defining the current climate state.