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Abstract

Meteorological or climatological extremes are rare and hence studying them requires long meteorological data sets. Moreover, for addressing the underlying atmospheric processes, detailed three-dimensional data are desired. Until recently the two requirements were incompatible as long meteorological series were only available for a few locations, whereas detailed 3-dimensional data sets such as reanalyses were limited to the past few decades. In 2011, the “Twentieth Century Reanalysis” (20CR) was released, a 6-hourly global atmospheric data set covering the past 140 years, thus combining the two properties. The collection of short papers in this volume contains case studies of individual extreme events in the 20CR data set. In this overview paper we introduce the first six cases and summarise some common findings. All of the events are represented in 20CR in a physically consistent way, allowing further meteorological interpretations and process studies. Also, for most of the events, the magnitudes are underestimated in the ensemble mean. Possible causes are addressed. For interpreting extrema it may be necessary to address individual ensemble members. Also, the density of observations underlying 20CR should be considered. Finally, we point to problems in wind speeds over the Arctic and the northern North Pacific in 20CR prior to the 1950s.