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Use of several indices of event severity for floods and droughts

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Abstract. An examination is made of the true return periods associated with certain types of composite indices for the rareness of events. In particular, return periods are evaluated separately for several different ways of describing how bad an event was, and the composite index, or apparent return period, is defined as the largest of these component return periods. Such apparent return periods give an incorrect indication of how often a larger value for the composite index will occur. Simulations are used to study the relationship between the true and apparent return periods for some simple cases, and an assessment is made of the extent of the error made if the apparent return period is used directly. A simple practical procedure is described for dealing with real datasets without model-fitting, and this is assessed using further simulations. An example is given relating to a possible flood situation where a composite index is constructed as the largest of the return periods of high rainfall-accumulations over a number of durations.

Keywords: drought severity index, composite index, event severity, return period

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