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Optimizing the Analog Method's synoptic sector under boundary conditions for projecting ensembles of flood-occurrences driven by three pathways of mankind

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In order to allow anticipatory planning achieving statistically robust strategies, all necessary calculations involved in setting them up have to draw on well occupied ensembles of losc projections. If, aside from that, such ensembles are also available for different pathways of mankind, resulting strategies are not only statistically robust but refer on top of that to corridors, which jointly encompass sufficient parts of potential future developments (e.g. of future threat-occurrences).

Both features enhance the validity and significance of in such way established strategies, which are - in case of civil protection and the defense of critical infrastructure against damaging events - evidently worth striving for. Therefore, the goal we present here is the generation of - statistically as well as in terms of mankind's evolution - robust ensembles in the European Alps, where they are much required.

This goal is achieved by an ESD technique termed Analog Method, which rests on capturing synoptic dynamics and the grading of similarity between observed and projected patterns ('analogs') whereby physically consistent losc weather conditions are assigned to GCM patterns.

In order to ensure optimal quality of the derived ensembles as well as coherence amongst weather conditions in all considered losc regions, we have to solve two optimization problems. One of these refers to the dimensions of the atmospheric window used for analog-detection and is a problem under two boundary conditions imposed by von Storch et al. (1993) and van den Dool (1994). The first pertains to GCMs' skillful scale and, hence, sets an infimum to the space dimensions to be considered, whilst the latter claim corresponds to a supremum stating it's outstandingly unlikely to identify proper analogs at high dimensions.

The other optimization problem is associated with the determination of the most suitable geographical position within a large sector over the North Atlantic, the continent and the Mediterranean, on which the atmospheric window best has to be centered. Findings are presented, discussed and put into context.