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A new procedure in support of decision-making to sustain current high levels in civil protection and Europe's supply-chain jeopardized by increasing climate-change driven damage-events

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Contents of this contribution sketch the derivation of this procedure and its successful application to the (so-far) largest and most complex civil-protection project implemented in Austria after WWII. Results, rely largely on three master theses carried out within a cooperation of the Climate Impact Team (CIT) at ZAMG, the BMNT and the Institute of Meteorology and Geophysics at the University of Vienna. Apart therefrom findings profit greatly from a close cooperation of CIT and the European Freight and Logistics Leaders' Forum (F&L).

The goal is to support decision makers in designing and implementing efficient and sustainable protection against changing threats. This necessitates extensive preparatory work: (i) the generation of ensembles comprising regional-scale climate-change scenarios until 2100, driven by different pathways of mankind (RCPs: 2.6, 4.5 and 8.5, RCPs - Representative Concentration Pathways); (ii) facilitated under the umbrella of the BMNT: first-time integration of the three most comprehensive national cadasters of extreme-weather induced hazard-events; the outstanding scope and quality of these cadasters enable the compilation of the so-called 'event space' , which is now Austria's most extensive database of weather driven hazard-processes (well above 20.000 records from 1948 onwards); this wealth of observations (we focus here on landslides and floodings) allows for (iii) in depth analyses (von Storch and Zwiers, 1999) of linkages between extreme weather and potential damage events, distinguishing at the same time (iv) amongst process-categories as well as sub-regions within Austria's share of the European Alps: 'Alpine Territory', 'Northern Lowlands' and the 'Southern Basin Chain'; blending (v) the 'event space' with spatial high-resolved, daily observations of precipitation totals and temperature values (SPARTACUS, Hiebl and Frei 2015, 2017) sets the frame required for the (vi) identification-procedure of region- and category-sensitive weather sequences triggering potential damage-events (so-called Climate Indices, CIs); step (vii) derives future CIs occurrences from previously downgescaled ensembles within 'near' (2036-2065) and 'remote' periods (2071-2100) and assesses results in terms of current levels; sustainable protection structures must withstand these 'near' (and 'remote') threat levels;

Step (viii) finally demonstrates the successful application of the procedure calibrated by the expertise of our partners in charge of public protection protection, to Austria's (so far) largest project in public protection since WWII, in which methods currently available have not provided guidance.

Presently BMNT surveys adjustments required for the integration of the procedure. Aside therefrom, its application to critical transport infrastructure is in discussion with the Forum of European Freight and Logistics Leaders (F\&L), because members are experiencing rises of supply-chain disruptions due to climate-change driven hazard events.