Changing transport and traffic risks - a CliPDaR spin off

Matulla[1], Namyslo[2], Andre[1], Gringinger[1,3], Chimani[1], Hollosi[1], Fuchs[2], Auer[1], Mlinar[4], Gschier[5]

[1]Central Institute for Meteorology and Geodynamics, ZAMG, Austria
[2]German National Meteorological Service, DWD, Germany
[3]University of Vienna, Austria
[4]Autobahn and high way financing stock corporation, ASFINAG, Austria
[5]Federal Ministry for Transport, Innovation and Technology, BMVIT, Austria

The delivery of goods, people's mobility, the supply with services and the free accessibility of vital resources, as hospitals for instance, are indispensable for our society. All that is possible through functioning transport networks. Globalisation, changes in technology, demography and climate as well as the strong increase in freight traffic are fundamental challenges to the reinforcement of systems in place and the planning of future transport corridors. As for climate change we present an approach to estimate the rate and amount of change that has to be managed in the future by the transport authorities.

This assessment is based on combinations of climate elements that potentially harm the transport system. Such combinations (called climate indices, CIs) are evaluated for the past and the future. The evaluation of the past refers to the observation period; the assessment of the future is based on ensembles of climate projections, since a single projection does not allow deriving uncertainty based statements. Landslides originating from long term rain events may serve as an example. In 2013 a number of landslides caused substantial destruction and downtimes. The perhaps most prominent example took place in Tirol where the Felbertauern road was hit twice by landslides and the avalanche gallery was destroyed.

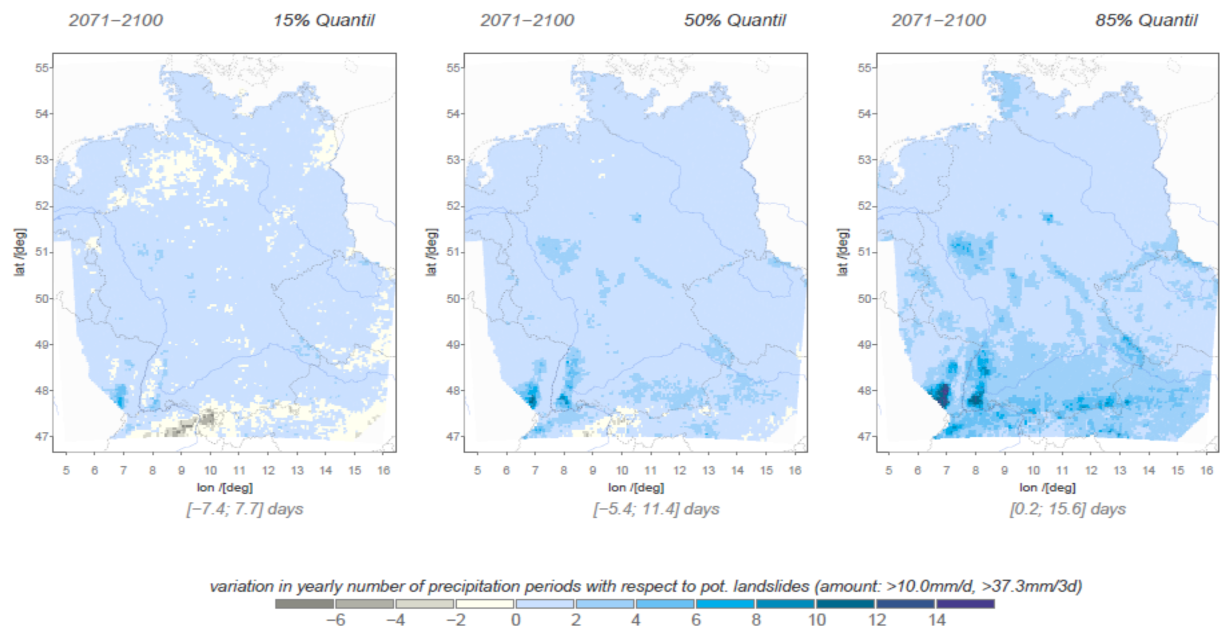

Figure 1: *The three panels show the 15th, the median and the 85th percentile of the amount of three days of rain each having at least 10mm, and exceeding together 37mm in total for the period 2071-2100 relative to the past (1961-1990). White areas indicate no change and deep blue regions show substantial increases. The panels are based on the so called KLIWAS8 ensemble driven with SRES-A1B forcings.*

Figure 1 shows the change in three day long rain events (each day having at least 10mm, adding up to a total larger than 37mm) in the period 2071-2100 relative to 1961-1990 as an example of such CIs. There are regions showing no change and others with substantial increases, which predominantly occur close to topographic complex terrain. Such regions are characterized by precipitation induced by orographic lifting. Increases can be caused by the more frequent advection of moist air masses carrying more water vapour than observed so far. The findings rely on the so called KLIWAS8 ensemble used already by Matulla et al. (2013) in related cases and generated by Imbery et al. (2013). So 70% of the regional scale climate change realizations are encased between the left and right panels. Educated decisions regarding the planning of transport networks and the reinforcement of existing assets ought to be based on such an analysis, which supplies information on the geographical distribution of probable changes in the occurrence of hazardous situations. This is to be further elaborated in the presentation.

Corresponding author: Dr. Christoph Matulla christioph.matulla@zamg.ac.at ZAMG, Hohe Warte 38 1190 Vienna, Austria