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Changing transport and traffic risks - a CliPDaR spin off

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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 than has to be managed in the future by the transport authorities.

This assessment is based on combinations of weather 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 is done by the use of observations; the assessment of the future is based on ensembles of scenario 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 in turn. The perhaps most prominent example took place in Tirol where the Felbertauern road was hit twice by landslides and the avalanche gallery was destroyed.

In our presentation at the EGU we will show changes in CIs that are related to landslides, rutting, frost thaw cycles (e.g. responsible for falling roks) and heavy precipitation events (potentially important for the flooding of transport assets as tunnels and drainage systems or dangerous to bridges). These changes refer to two future periods: the near future (2021-2050) and the remote future (2071-2100); and they refer to the climatological normal period (19961-1990).

Referring to landslides there are regions showing no change and other areas 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. 2014 in related cases and generated by Imbery et al. 2013. Findings will be depicted by the 15th 50th and 85th percentiles which allow to cover ranges of possible changes. This way proper measures handy for decision making regarding the planning of transport networks and the reinforcement of existing assets may be developed.