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Downscaling socio-economic prospective scenarios with a participatory approach for assessing the possible impacts of future land use and cover changes on the vulnerability of societies to mountain risks

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Due to the peculiarities of their landscapes and topography, mountain areas bring together a large range of socio-economic activities whose sustainability is likely to be jeopardised by projected global changes. Disturbance of hydro-meteorological processes will alter slope stability and affect mountain hazards occurrence. Meanwhile, socio-economic transformations will influence land use and cover changes (LUCC), which in turn will affect both hazards occurrence and hazards consequences on buildings, infrastructures and societies. Already faced with recurrent natural hazards, mountain areas will have to cope with increasing natural risks in the future. Better understanding the pathways through which future socio-economic changes might influence LUCC at local scale is thus a crucial step to assess accurately the vulnerability and adaptive capacity of societies to mountain risks in a global change context.

Scientists face two main issues in assessing spatially explicit impacts of socio-economic scenarios in mountainous landscapes. First, modelling LUCC at local scale still faces many challenges related to past (observed) LUCC and those to consider in the future in terms of dynamics and processes. Second, downscaling global socio-economic scenarios so that they provide useful input for local LUCC models requires a thorough analysis of local social dynamics and economic drivers at stake, which falls short with current practices. Numerous socio-economic prospective scenarios have recently been developed at regional, national and international scales. They mostly rely on literature reviews and expert workshops carried out through global sectoral analysis (e.g. agriculture, forestry or industry) but only few of these exercises attempt to decline global scenarios at smaller scales confronting global vision with information gathered from the field and stakeholders. Yet, vulnerability assessments are more useful when undertaken at local scales that are relevant to geophysical fluxes and local decision-making processes. Therefore, there is a need to downscale socio-economic prospective scenarios so that they are both consistent with global scenarios used to feed public policies and relevant for local policy-makers in charge of implementing natural risks management strategies.

This paper investigates the contribution of coupling participatory approach in downscaling socio-economic prospective scenarios with spatially explicit LUCC modelling to assess future changes in mountain risks. We present an on-going work aiming at co-constructing with local stakeholders integrated city-scale socio-economic scenarios up to 2040 and 2100 in a way that is consistent with the requirements of LUCC models. The study site is located in the city of Cauterets (Pyrenean Mountains, France).