EGU21-5711
https://doi.org/10.5194/egusphere-egu21-5711
EGU General Assembly 2021

A vulnerability index for climate related risks in Sweden

Jan Haas[1,2], Konstantinos Karagiorgos[1,3], Lars Nyberg[1,3], and Andreas Pettersson[1]
[1]Centre for Societal Risk Research (CSR), Karlstad University, Sweden (jan.haas@kau.se)
[2]Geomatics, Department of Environmental and Life Sciences, Karlstad University, Sweden
[3]Centre of Natural Hazards and Disaster Science (CNDS), Sweden

Social vulnerability is mostly described as specific social inequalities in the context of a disaster. Following this understanding, empirical research focuses on the unequal exposure of different groups to disasters and/or on the unequal capacities of groups to anticipate, cope and recover from the impact of a hazard. Although social vulnerability has recently gained attention in academia, Sweden lacks frameworks and indicators to assess it at a national level.

Following the large amount of publicly available data in Sweden, to address this gap, we present a method for quantifying social vulnerability to climate risks in Swedish municipalities. A large number of variables were collected and analyzed to create quantitative indicators that purport to measure a municipality's vulnerability. Using Principal Component Analysis (PCA), the information in the variables was reduced to a smaller number of components and socioeconomic vulnerability scores for each Swedish municipality. The factor analysis resulted in five components explaining more than 75% of the total variance. The resulting components and the final index are mapped for each municipality.

The results show that socio-economic vulnerability is not evenly distributed across Sweden. Apart from those findings the fact that some municipal clusters are much more vulnerable than others, the developed method is a useful tool for comparing socio-economic conditions among municipalities and for identifying susceptible municipalities which are likely to face significant challenges in coping with future natural hazard events.

Preliminary results show similar trends of social vulnerability to natural hazards at a highly resolved spatial level of aggregation as comparted to municipal levels. As studies on social vulnerability are often data-driven and thus performed on larger administrative aggregations, the sub-set of socio-economic variables from Statistics Sweden used in this study was found useful in our approach. In order to explore social vulnerability in conjunction with coastal and fluvial flood scenarios, an interactive web map was created with ArcGIS Dashboards.