



Reviewing and visualising relationships between anthropic processes and natural hazards within a multi-hazard framework

Joel C. Gill and Bruce D. Malamud

King's College London, Geography, United Kingdom (joel.gill@kcl.ac.uk)

Here we present a broad overview of the interaction relationships between 17 anthropic processes and 21 different natural hazard types. Anthropic processes are grouped into seven categories (subsurface extraction, subsurface addition, land use change, explosions, hydrological change, surface construction processes, miscellaneous). Natural hazards are grouped into six categories (geophysical, hydrological, shallow earth processes, atmospheric, biophysical and space). A wide-ranging review based on grey- and peer-reviewed literature from many scientific disciplines identified 54 relationships where anthropic processes have been noted to trigger natural hazards. We record case studies for all but three of these relationships. Based on the results of this review, we find that the anthropic processes of deforestation, explosions (conventional and nuclear) and reservoir construction could trigger the widest range of different natural hazard types. We also note that within the natural hazards, landslides and earthquakes are those that could be triggered by the widest range of anthropic processes. This work also examines the possibility of anthropic processes (i) resulting in an increased occurrence of a particular hazard interaction (e.g., deforestation could result in an increased interaction between storms and landslides); and (ii) inadvertently reducing the likelihood of a natural hazard or natural hazard interaction (e.g., poor drainage or deforestation reducing the likelihood of wildfires triggered by lightning). This study synthesises, using accessible visualisation techniques, the large amounts of anthropic process and natural hazard information from our review. In it we have outlined the importance of considering anthropic processes within any analysis of hazard interactions, and we reinforce the importance of a holistic approach to natural hazard assessment, mitigation and management.