



## **Karst in Vietnam: natural occurrence, resource, and hazard**

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Vietnam territory comprises thick sequences of carbonate rocks, mostly limestone, of variable ages, which are widespread in northern and central Vietnam. Intense and long-lived tectonic activities though Paleozoic to present have resulted in multiple deformation and complex structural interference pattern of the carbonate sequences within ancient orogenic belts. Surface processes during the late Cenozoic time in the context of tropical weather condition have led to the formation of unique karst topography in the carbonate terranes in Vietnam, both inland and offshore. The country currently hosts some of the most famous, world-class natural karst terranes. Among them, Ha Long Bay and Phong Nha – Ke Bang cavern areas have been recognized as the World Natural Heritage sites and the Cat Ba islands were awarded as a World's Natural Reserve by UNESCO. However, the widespread of karst topography have also brings about natural hazards, which have negative affects on the well being of the local communities within the karst areas. The most severd negative affects are the development of caverns and sinkholes in the populated areas, which commonly lead to the collapse of infrastructures as well as human casualties. Beside, residents in many karst areas in Vietnam are suffered from either water shortage or groundwater pollution. In conversion, human activities also intensified the development of the hazards in the karst areas by over-exploitation of groundwater and construction of heavy structures above the cavern areas.