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Impact of climate change and sea level rise on a coastal aquifer, Central Vietnam

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The Gio Linh district in the Quang Tri province, Central Vietnam has, like many other coastal areas in the world, to deal with negative impacts of Global Climate Change (GCC) and sea level rise (SLR). This research aims at investigating the impact of GCC/SLR and designing an adaptive water use plan till the year 2030 for the 150,000 local residents of the Gio Linh district and the city of Dong Ha. The coastal plain covers an area of about 450 km2 between the rivers Ben Hai in the North and Thach Han in the South. The area has a tropical monsoon climate which is characterized by an average precipitation of 1500 to 2700 mm in nearly 180 days from August to April.
GCC/SLR scenarios are built and assessed for estimating the changes in hydrometeorological conditions of the study area. Depending on the level of gas emission the sea level is expected to rise 7-9 cm by 2020 and around 11-14 cm by 2030 for low to high gas emission respectively. The salt-freshwater interface is expected to experience an inland shift due to SLR, affecting the amount of exploitable groundwater for drinking and irrigation water production.
Water production mainly comes from shallow aquifers in unconsolidated Quarternary coastal formations. These geological formations have a highly heterogeneous lithology. A 3D groundwater model is built to study possible seawater intrusion under the changing conditions. Data from meteorological stations over a period of about 30 years and some data from 63 boreholes in and around the Gio Linh district are available. Geophysical measurements have been carried out recently and in the past and are used to support the model.