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Volcanic hazard assessment at Deception Island

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Deception Island is the most active volcano of the South Shetland Islands (Antarctica) with more than twenty eruptions recognised over the past two centuries. The island was formed on the expansion axis of the Central Bransfield Strait and its evolution consists of constructive and destructive phases. A first a shield phase was followed by the construction of a central edifice and formation of the caldera with a final monogenetic volcanism along the caldera rim. The post-caldera magma composition varies from andesitic-basaltic to dacitic. The activity is characterised by monogenetic eruptions of low volume and short duration. The eruptions show a variable degree of explosivity, strombolian or phreatomagmatic, with a VEI 2 to 4, which have generated a wide variety of pyroclastic deposits and lavas. It is remarkable how many phases of phreatic explosive eruptions are associated to the emission of large ballistic blocks. Tephra record preserved in the glacier ice of Livingston Island or in marine sediments show the explosive power of the phreatomagmatic phases and the wide dispersal of its finest products in a great variety of directions of the prevailing winds. Also it is important to highlight the presence of different lahar deposits associated with some of these eruptions. In this contribution we present the guidelines to conduct a short-term and long-term volcanic hazard assessment at Deception Island. We apply probabilistic methods to estimate the susceptibility, statistical techniques to determine the eruption recurrence and eruptive scenario, and reproduce the effects of historical eruptions too. Volcanic hazard maps and scenarios are obtained using a Voris-based model tool (Felpeto et al., 2007) in a free Geographical Information System (GIS), a Quantum GIS.