



On Feasibility to Detect Volcanoes Hidden under Ice of Antarctica via their “Gravitational Signal”

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Many not yet discovered volcanoes may be hidden under thick layers of ice of Antarctica. We seek for hypothetical volcanoes by means of the best present-day gravitational data (gravity field model EIGEN 6C4) and bedrock topography data (Bedmap 2). Our method is novel, never has been used before. We make use of analogy with the „gravitational signal“ typical for volcanoes and other structures in other parts of the Earth. We utilize various functionals and functions (not only ordinary gravity anomalies) of the disturbing geopotential. We work with Marussi tensor of the second derivatives, with the invariants and their ratios, the strike angle and with the virtual deformations. Are the best present-day gravitational and topographic data of sufficient precision and resolution? How fast is the attenuation of the „gravitational signal“ of a volcano with increasing depth under the ice? We answer these questions and find that there is no principal obstacle to detect volcanoes by our method. Our present-day attempts to discover such volcanoes can hardly be of a big success, because of low resolution (mainly) of the existing gravity data and (partly) due to low resolution of the best bedrock topography of Antarctica now available, but we try and present few examples.