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Geophysical Applications of EGM 08: Search for Impact Craters on the Earth

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The Earth Gravitational Model EGM08 has intensively been tested since its release at the EGU Assembly, Vienna 2008. EGM08 derived from GRACE data and a worldwide set of terrestrial gravity anomalies is complete to degree and order 2160 in the spherical harmonic expansion. Thus, it yields globally an unprecedented precision and resolution for geoidal undulations and other functionals of the Earth gravitational potential. One of many possible geophysical applications of the model is a confirmation of known and search for unknown impact craters on the Earth. We computed gravity anomalies and second and third radial derivatives of the disturbing potential namely in areas of known impact craters and we verified the existence of all geologically confirmed craters with a diameter larger than approximately 30 km. Moreover, we have found few new candidates for the impact craters closely connected with and in vicinity of the existing structures like Chicxulub (Mexico) and Popigai (Siberia). We elaborate upon this work by a more detailed analysis, for example by estimating a signal to noise ratio for all the computed functionals or by more reliable modeling of gravitational signals of the craters.