



Meteoritic Nickel Contamination of soils

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Before 2007, all known small (<150 m in diameter) impact craters on Earth were related to iron impactors. Fragments of such impactors survived the process and were later recovered in the vicinity of the crater as iron meteorites. In 2007, the Carancas crater in Peru was formed by the impact of a stony object and some surviving fragments of the impactor could be immediately recovered. Weathering of impactor fragments, especially for old impact events, may completely obliterate the extraterrestrial origin of this material, making even the confirmation of impact structure difficult, in absence of other lines of evidence.

This work focuses on the possible identification of small impact craters by improving our understanding of nickel mobility during weathering of meteorites within soils. Nickel is a relatively rare element in terrestrial rocks, but is generally common in meteorites. Even though weathering and alteration may make the original meteorite unrecognizable, an anomalous high concentration of nickel in soils might indicate an extraterrestrial contribution. To prove this hypothesis, we propose to measure nickel and PGE concentration in soil samples collected at increasing distance from meteorite fall location of young falls, such as Morasko and Pultusk in Poland.

Better understanding nickel mobility during weathering of meteorites in soil can help to detect currently unknown impact craters on Earth. This is crucial to improve our understanding of the impact rate, and make our planet safer from the space impactors.