Mapping Terrestrial Impact Craters with the TanDEM-X Digital Elevation Model

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We use the global digital elevation model (DEM) generated in the TanDEM-X mission for mapping the confirmed terrestrial impact craters. The TanDEM-X mission generates a global DEM with unprecedented properties. The achieved global coverage together with the improved accuracy (in the sub-10 m range) and spatial resolution (12 m at the equator) opens new opportunities in impact crater research based on terrestrial space-borne remote sensing data. It permits both for simple and complex craters investigations and illustrations of the morphology of the particular structure (rim height, central uplift, ring-like patterns, elevation profiles) and of the surrounding terrain (local deformation, drainage patterns) of outstanding quality. A commonly accepted catalogue of confirmed terrestrial impact craters is the Earth Impact Database of the Planetary and Space Science Center (PASSC) at the University of New Brunswick, Canada. It contains 183 entries. Besides the standard crater properties such as longitude/latitude, diameter and age, also exposure to the surface is provided as a crater parameter. We have already browsed the database of quality monitoring products generated in the DEM processing environment when the individual X-band acquisitions are processed to yield the interim raw DEM data for the exposed structures listed in the Earth Impact Database. In total 109 sites could be identified where either a simple, complex (mostly eroded) or partially submerged structure can be found. First quantitative conclusions such as, e.g., relation between detectability and crater properties could also be drawn. Our study will be the first time that the complete record of exposed impact craters is analysed in a homogeneous and consistent manner using space-borne remote sensing data. These results will generate an illustrated reference catalogue which can be used for follow-on detailed studies of individual impact structures. In addition it may serve as a basis for the development of algorithms for detecting new features which are of potential impact origin.