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Dating tectonic structures on Mercury

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Mercury is a planet dominated by contractional features at a global scale, represented mainly by lobate scarps. These structures are the expression of surface-breaking thrust faults and are linear or arcuate features widely distributed on Mercury. Since they display a broad distribution of orientations their origin is hypothesized to be related to a global contraction. By summing of the crustal shortening associated to scarps, a decreasing of the planet radius of about 1-2 km (Strom et al., 1975, JGR, 80, 2478-2507) or more (Di Achille et al., 2012, Icarus, 221, 456-460) was calculated. This process was hypothesized to occur at the edge of the Late Heavy Bombardment ($\geq$3.8 Ga ago) (Strom et al., 1975, JGR, 80, 2478-2507; Watters and Nimmo, 2010, in Planetary tectonics, 15-80). The Messenger cameras (MDIS WAC and NAC), acquired images of new regions of the Mercury surface that allowed us to detect several new lobate scarps especially where the illumination geometry is more favorable for structural analysis (Di Achille et al., 2012, Icarus, 221, 456-460). Among these a 350 km-long thrust has been detected crossing a peak ring basin (about 186 km of diameter), located at 3°87' N and 87°17'E. The region encircled within the inner ring of the basin is covered by a smooth plain with evidence of a sin-deformational emplacement. This allowed us to give an age constrain of the tectonic structure. Indeed our preliminary crater count dates the smooth plain at 3.7-3.6 Ga fixing a straight upper limit to the contractional deformation in this sector of the planet.