



Deformation effects of the Effelsberg 100 m Radio Telescope

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The 100 m radio telescope of the Max-Planck-Institute for Radio Astronomy at Effelsberg has been used for geodetic VLBI in Europe since 1991. It had been built about 30 years ago with the premise that the main reflector follows a homologous deformation when being tilted to varying elevations. Through this specification, it was projected that the reflector always has a parabolic shape, though with varying parameters including the location of the focus. To compensate for this, the subreflector is relocated according to an elevation-dependent model. In May 2008, the deformation of the telescope's paraboloid was subject to a new type of survey being carried out with a total station being mounted head-down close to the sub-reflector of the telescope. 25 mini-reflectors have been mounted on the paraboloid and on the super-structure and have been observed with the total station in seven different elevations between 7 and 90 degrees. The analysis has to take into account that the location and orientation of the instrument changes due to gravitational deformations of the structure. We develop a model for the deformation of the paraboloid.