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Monitoring the stability of the radio telescope Wettzell

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The reference point stability of the receiving systems of space geodetic techniques is a fundamental aspect when regarding the stability of global reference frames. This comprises geometric aspects like local ground movements and distortions of the antenna structure as well as electrical aspects like antenna phase centers and cable delays. The ground motions at the Geodetic Observatory Wettzell are observed by a local geodetic network at regular intervals. The deformation of the radiotelescope tower is measured continuously since many years using a vertical strainmeter, which gives rise to seasonal height variations of a few millimeters. The distortion of the antenna tower in the vicinity of the reference point as a consequence of different load cases due to varying antenna azimuth and elevation positions, or thermal strains has been investigated in detail within a project of the Geodetic Institute of the Technical University Karlsruhe using tachymeter, laser tracker and tiltmeter observations over three month. The measured distortions, expressed as translations of the reference point, are far below 1 mm and proof the high stability of the antenna tower.