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Comparison of broad band time series recorded parallel by FGI type interferometric water level and Lippmann type pendulum tilt meters at Conrad observatory, Austria

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The Finnish Geodetic Institute (FGI) the progenitor of Finnish Geospatial Research Institute of NLS designed and built a 5.5m long prototype of interferometric water level tiltmeter (iWT) in early 2014. Geodetic and Geophysical Institute (GGI), Sopron, Hungary bought the instrument and started tilt measurement in August 2014 at the Conrad observatory (COBS), Austria to monitor geodynamical phenomena like microseisms, free oscillations of the Earth, earth tides, mass loading effects and crustal deformations in cooperation with Austrian Central Institute for Meteorology and Geodynamics (ZAMG) and the FGI. On the July 16 2015 a Lippmann-type 2D tilt sensor (LTS) was also installed by GGI on the 6 m long pier where iWT was set up previously. This situation opens a possibility to do broad band (from secular to seismic variations up to 15 Hz) geophysical signal analysis comparing the responses of long (several meters) and short (a few decimeters) base instruments implementing different physical principles (relative height change of a level surface and inclination change of the plumb line). The characteristics of the sensors are studied by the evaluation of the spectra of recorded signals dominated by microseisms. The iWT has internal interferometric calibration and it can be compared to Lippmanns tilt meter one. Both instruments show good long term (> 1 day) stability when earth tides and ocean and air mass loading tilts are modelled.