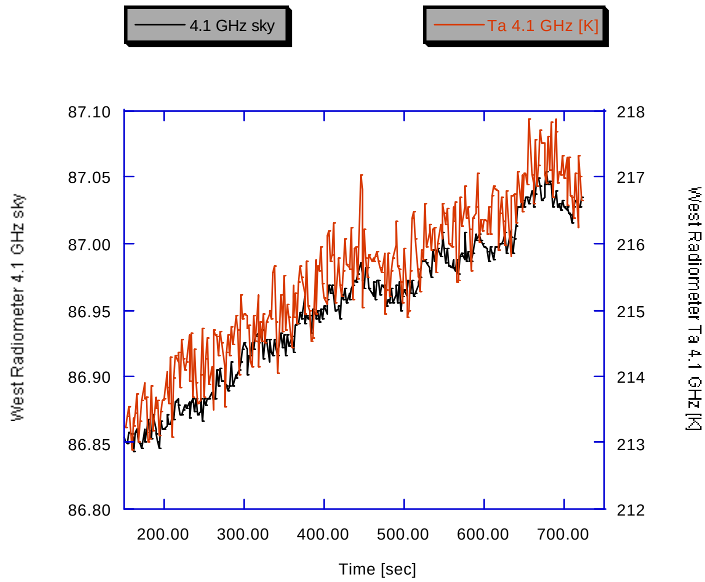
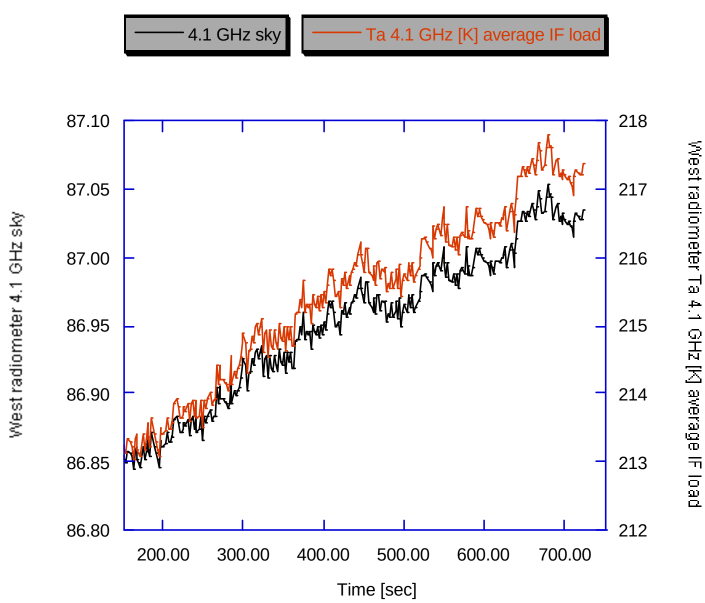
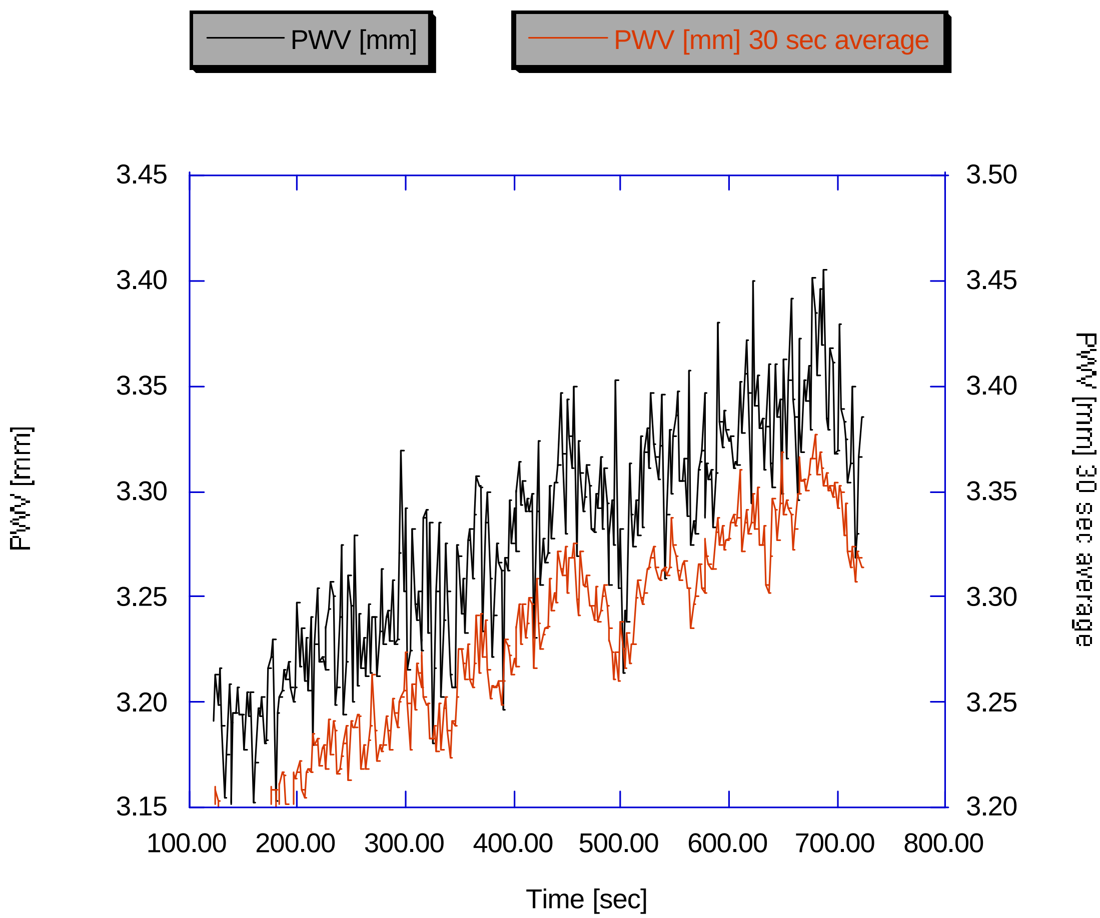
Calibrated antenna temperature compared with uncalibrated total power output of the 4.1 GHz IF channel on West radiometer



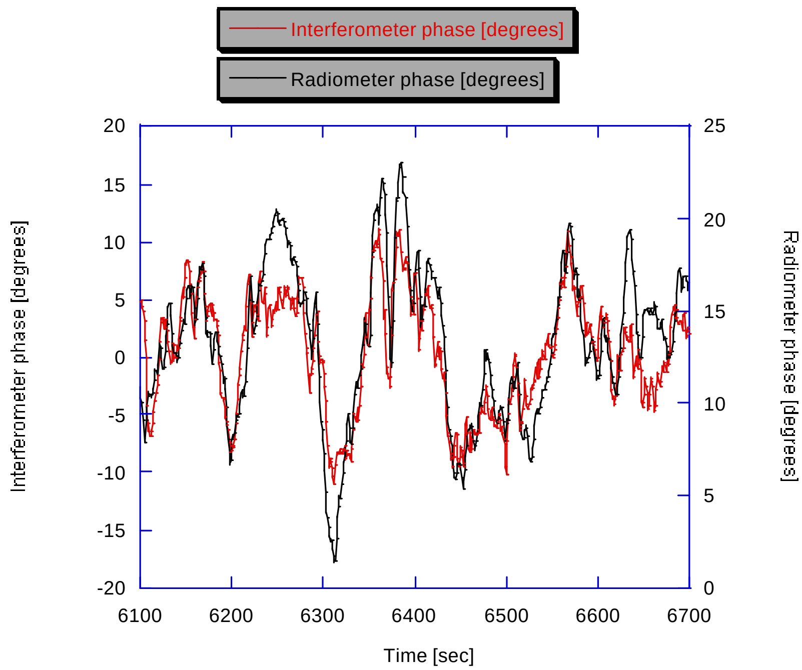
Calibrated antenna temperature compared with uncalibrated total power output of the 4.1 GHz IF channel on West radiometer for loads averaged over a 10-minute interval

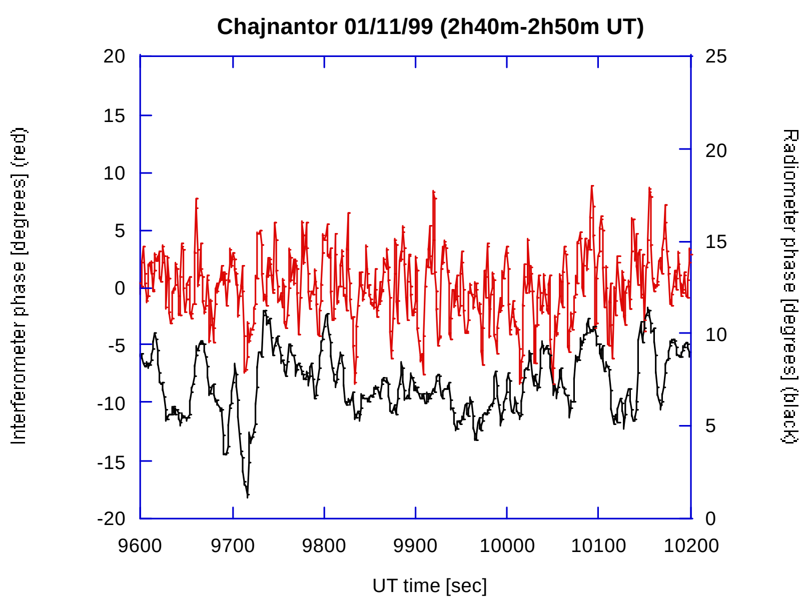


Comparison between PWV estimated without averaging load readings and 30-sec averaging of the load readings (curves have been artificially separated)

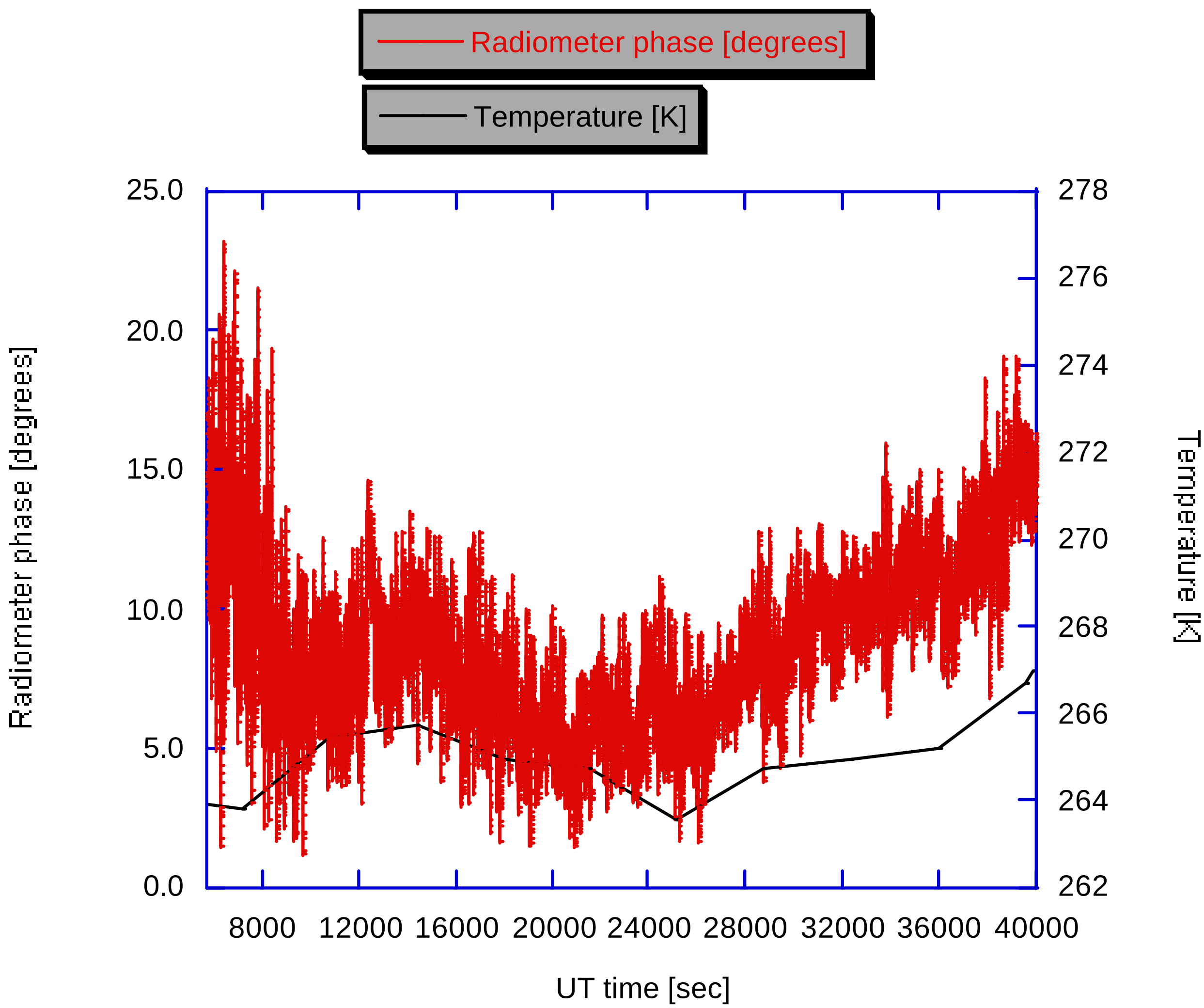


Phase variation measured with interferometer (red curve) and estimated from 183 GHz measurements (black curve) during 10 minutes, separated by 1 hour





Phase variation measured with radiometer (red curve) compared with ambient temperature (lower, black curve)



What we know so far:

- The calibration of the antenna temperature decreases the S/N by an order of magnitude.
- The half power beamwidth of the radiometers is ~2.5º (to be compared with 1.02º for the interferometer)
- Presently the separation between interferometer and radiometer antenna beams is ~27’, this is in the limit of accuracy of the pointing method.
- The phase prediction varies in accuracy for relatively short time scales. This might be related to the height of the turbulence layer (the Raleigh distance for the interferometer is ~240 m).
- The East radiometer gives systematically higher values of Ta. These seem to be correlated with ambient temperature.

What should we do:

- Calibrate the A/D channels in order to reduce the instrumental noise.
- Modify the optics of radiometers in order to equalise the beam sizes.
- Correlate the phase variation correlation to the height of the turbulence layer.
- Improve the alignment of mirrors in the East radiometer.