# Update on the WVR testing in Hawaii – March 2006

The radiometers are installed on two of the antennas of the Smithsonian Submillimeter Array on Mauna Kea. They have been working well and the measurements show that they are meeting (in fact exceeding) the requirements in terms of sensitivity, stability and so forth. The coupling to the sky is good, which means that the rather complicated optical relays work well. The radiometers have so far proved very reliable and the interfaces to the SMA control system are robust and effective. We routinely operate the system from the UK and can read out the water content of the atmosphere in real time and see the fluctuations.

We have made simultaneous measurements of the water emission and of the interferometric phase using quasars (in this case 3C273) with a baseline of ~200m. We have carried out a basic analysis of this data. This involves deriving from the radiometer readings the amounts of water along the line of sight of each antenna, taking the difference in these amounts, and then predicting what phase variation would be caused by this difference. There are no free parameters or fudge factors in this analysis (apart from an arbitrary DC offset in the phase which has been chosen to make the comparison easy in this plot):
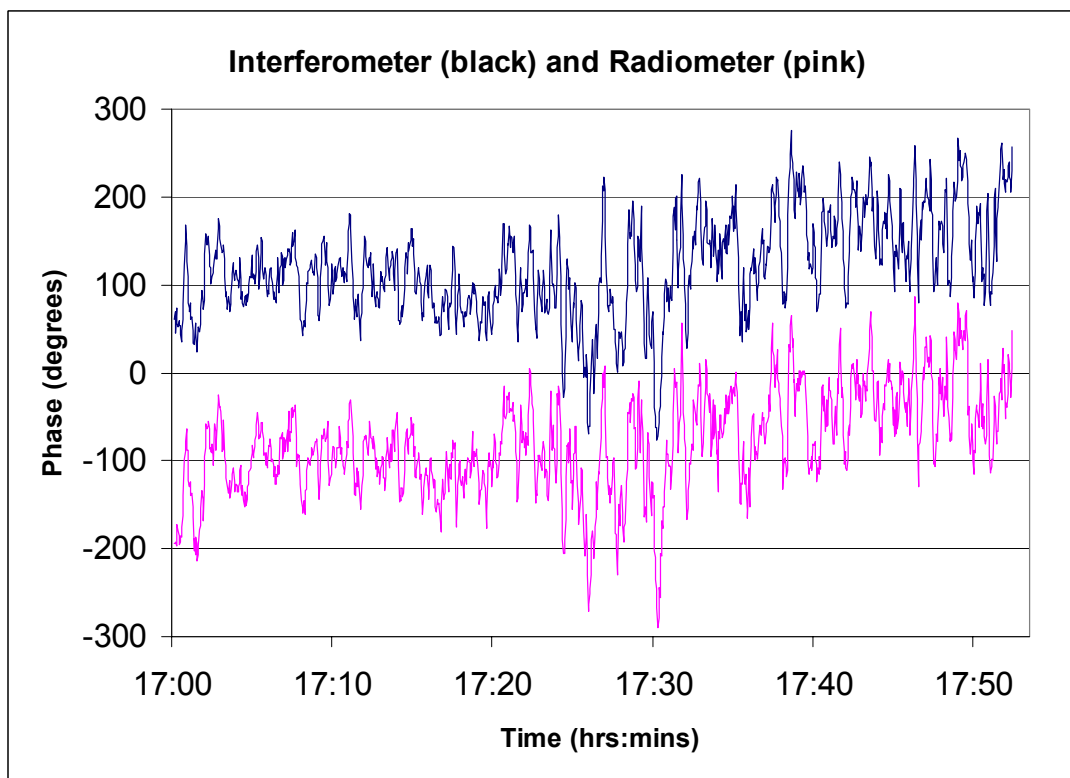
It is clear that the agreement is extremely good. In fact the correlation coefficient is over 0.9. These observations were made at night and under relatively poor conditions (3 to 4 mm of water in the line of sight) but they are clearly very encouraging.

What is needed now is to get data under a much wider range of conditions – dry as well as wet, day as well as night, etc. Unfortunately the last month or so has been the worst period of bad weather on Mauna Kea that anyone can remember – so bad that hardly any observing has been possible. We are anxiously awaiting the return of good weather so that we can push on with the test programme.

Richard Hills – on behalf of the ALMA WVR team in Cambridge, Onsala and at the SMA.