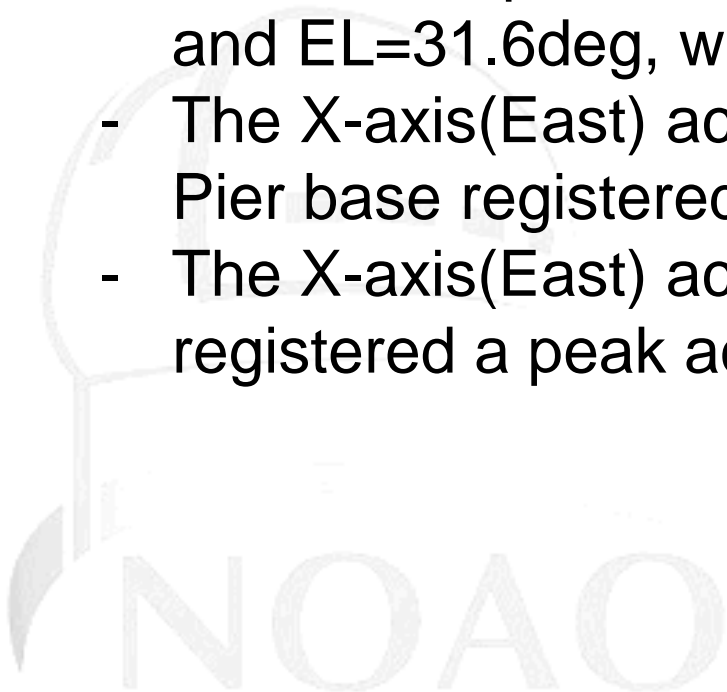
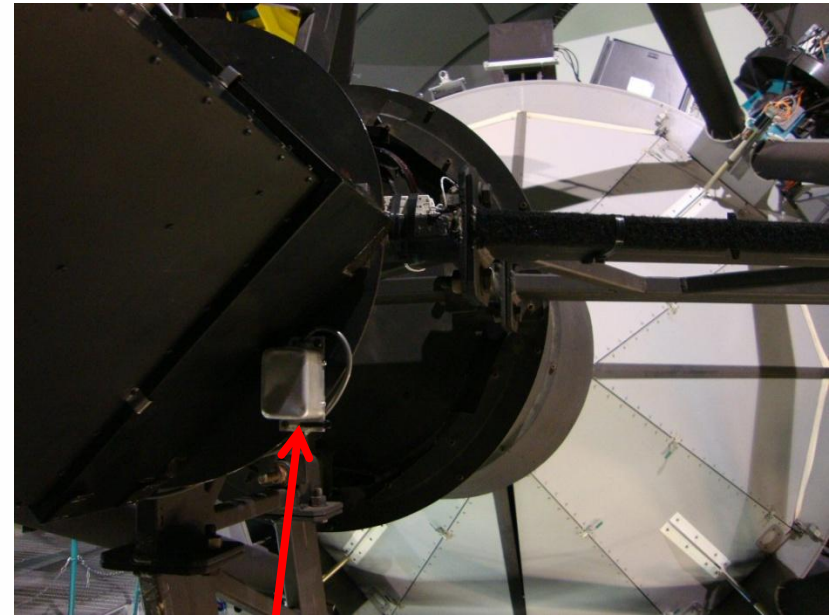
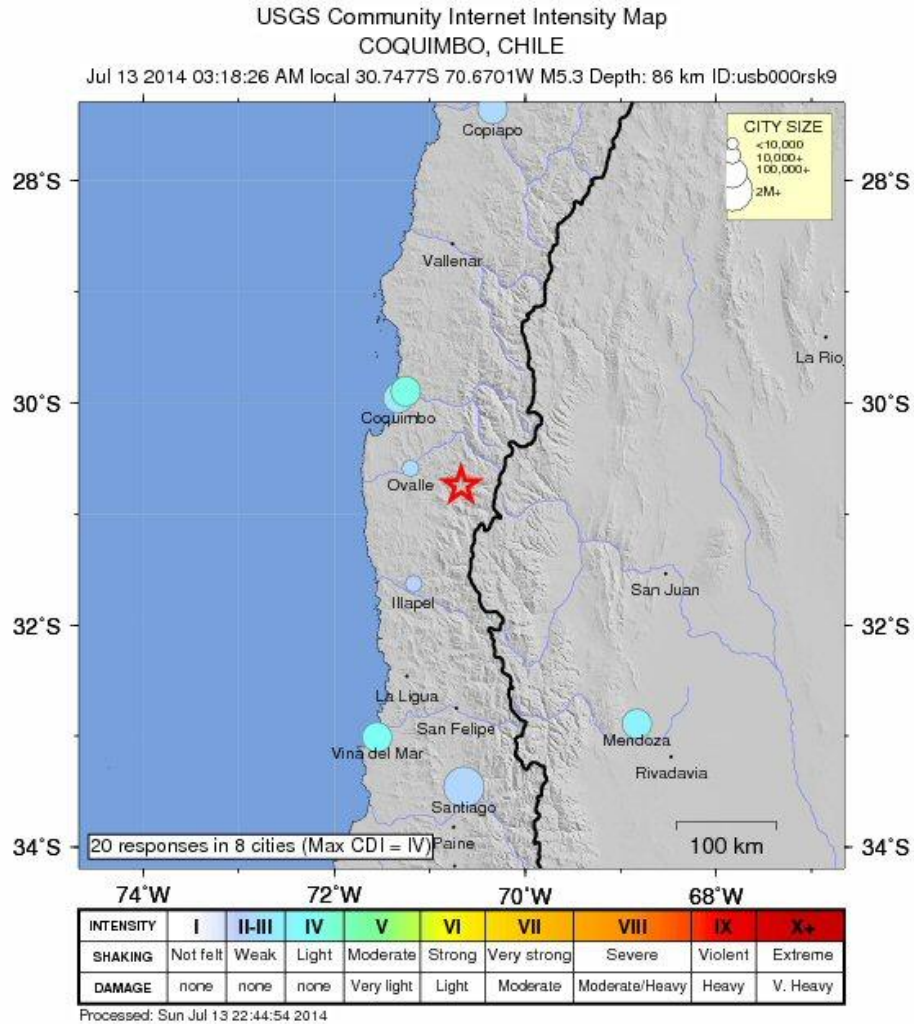


SOAR M5.3 Quake Analysis

- On 13-Jul-2014 03:18:25UT, a M5.3(USGS) earthquake, with an epicenter located 56.8Km to the SE of Cerro Pachon, at a depth of 86.2Km (100Km to origin)
- The telescope was tracking with an AZ=239.5deg, and EL=31.6deg, when the event occurred.
- The X-axis(East) accelerometer mounted on the Pier base registered a peak value of 0.1G.
- The X-axis(East) accelerometer mounted on top M2 registered a peak acceleration of 1.1G.



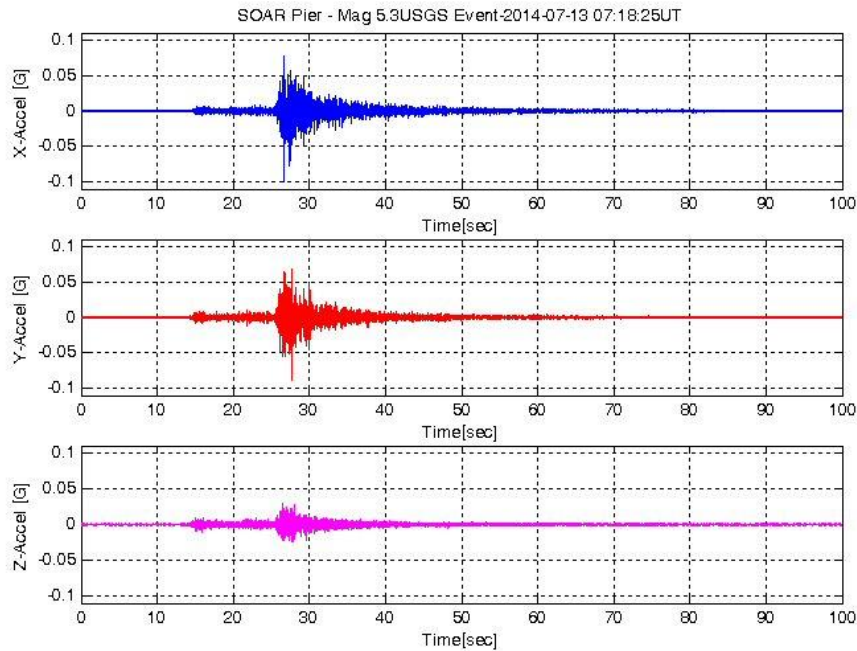
M5.3 Event, and M2 Base Accelerometer Location



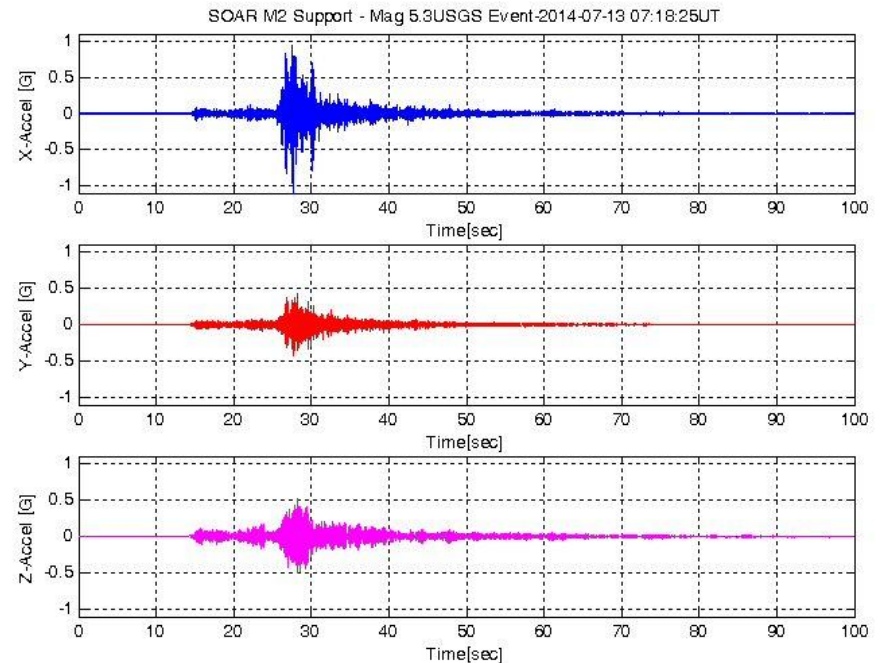
Accelerometer

Pier and M2 Base Accelerations (DC subtracted)

Pier Accelerations

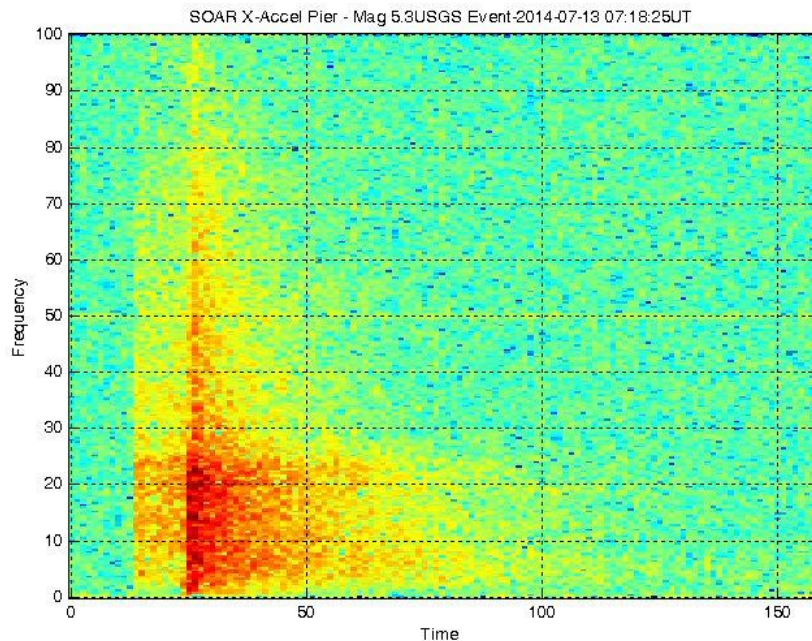


M2 Base Accelerations

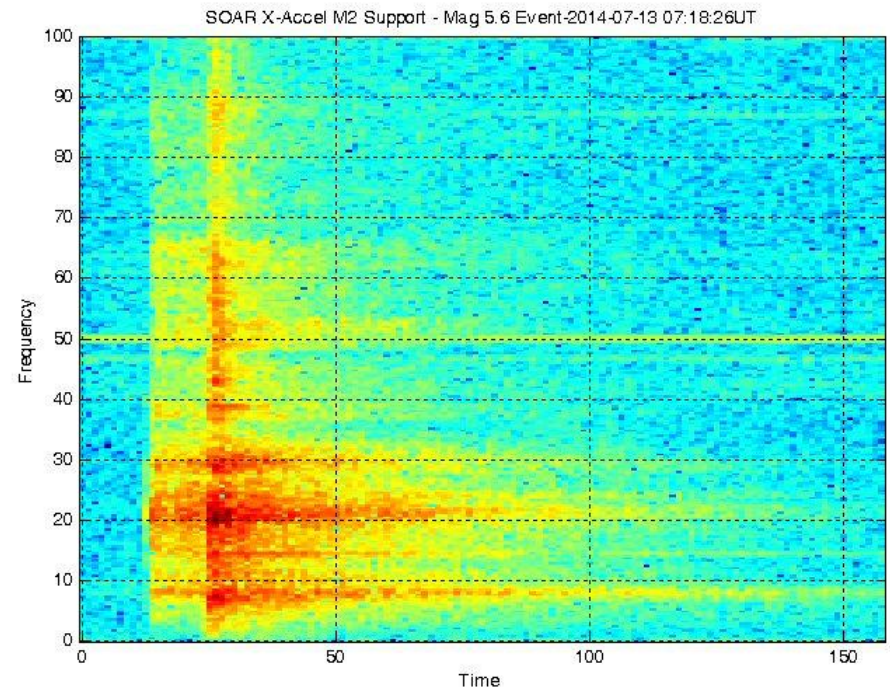


Pier and M2 Base X-Accelerometer Specgrams

Pier X-Accelerometer
Shows a broadband spectra
as expected.

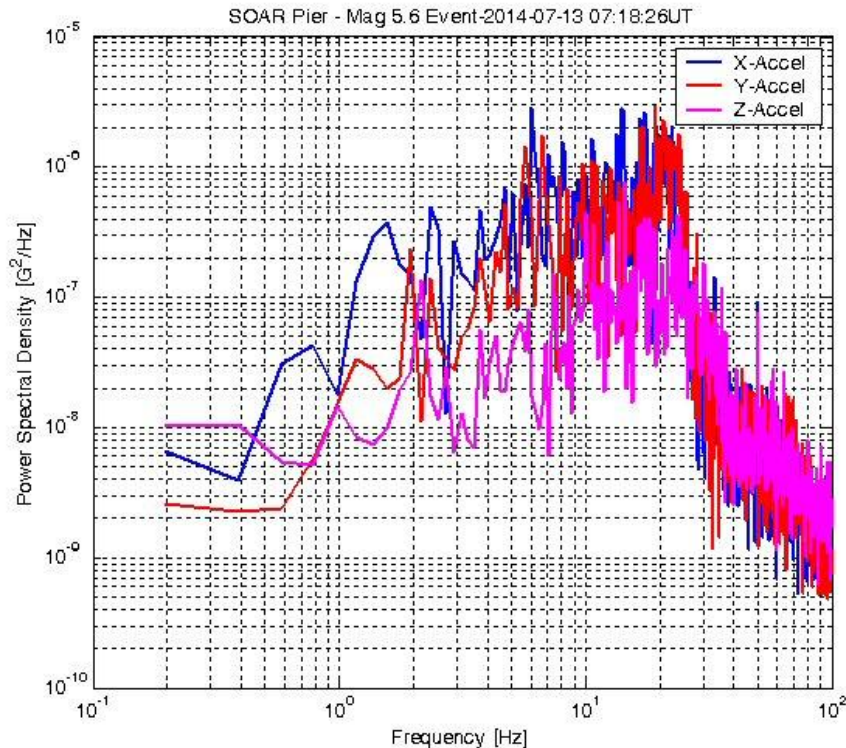


M2 Base X-Accelerometer
Shows several narrowband spectra
at structural resonances at 7.5Hz, 20Hz,
and 29Hz.

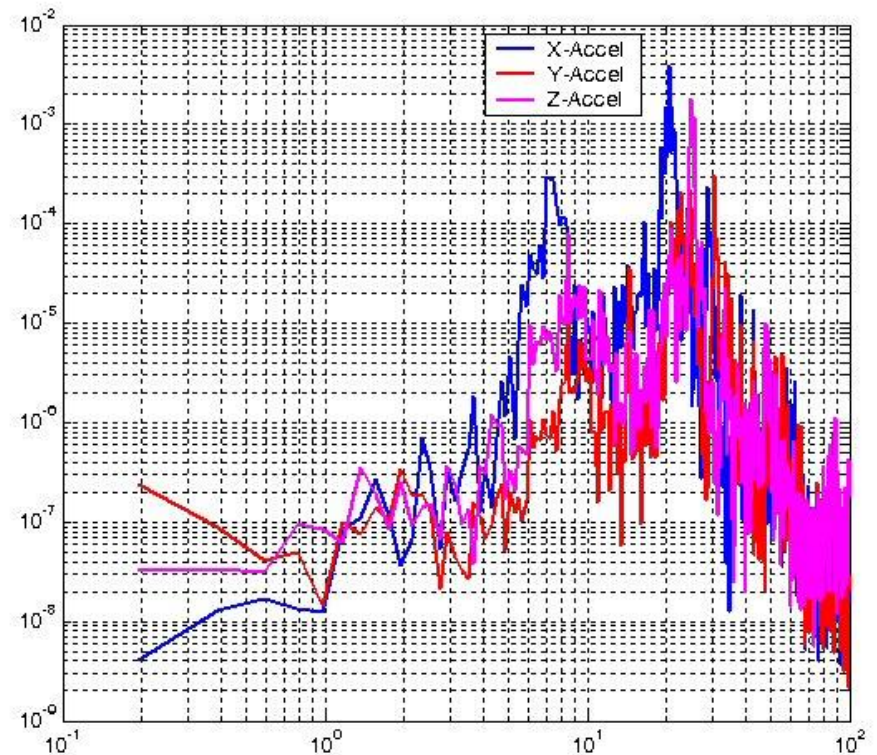


Pier and M2 Base Accelerometers Power Spectral Density (PSD)

Pier Accelerometers PSD
Shows cut-off at ~25Hz

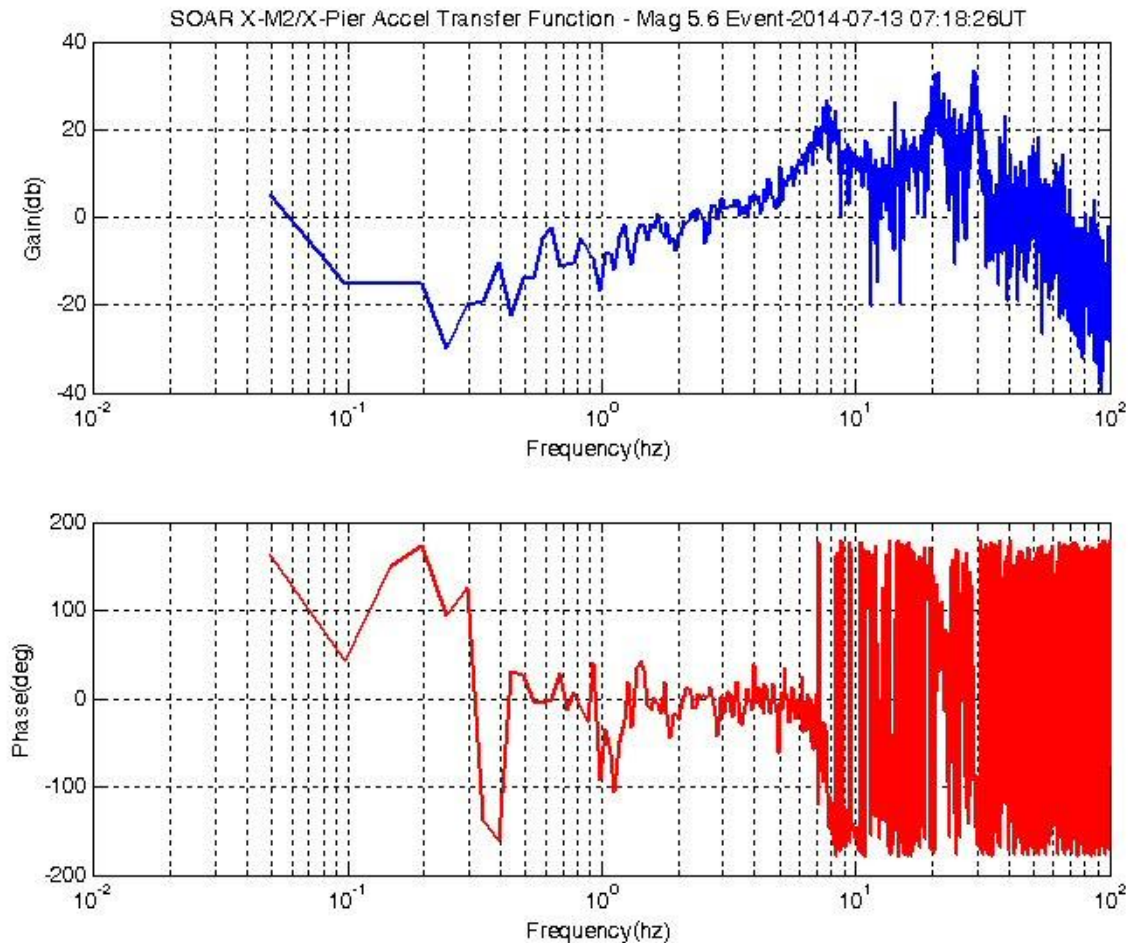


M2 Base Accelerometers PSD
Shows structural resonances

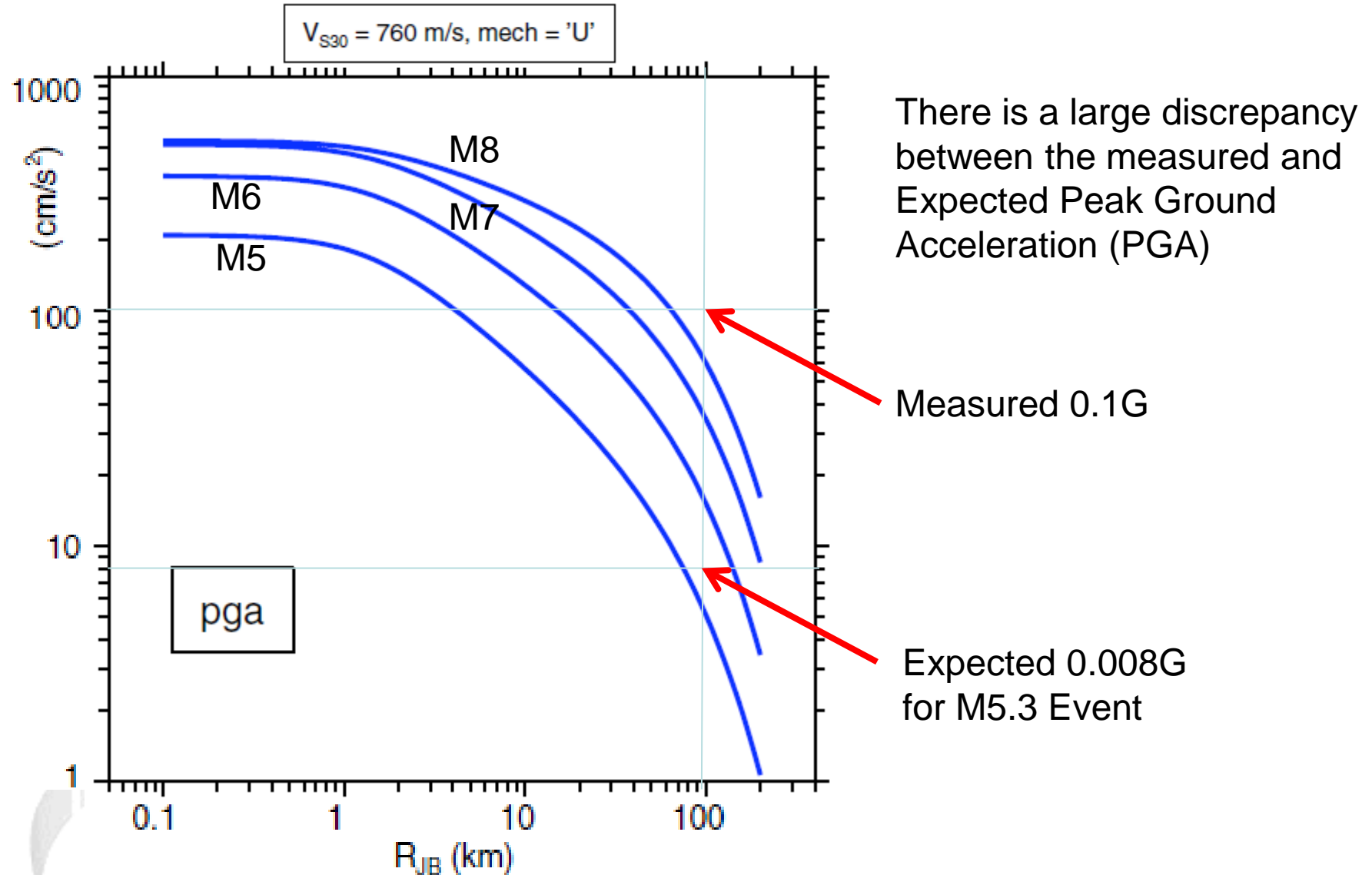


Pier to M2 Base X-Accelerometers Transfer Function Bode Plot

Transfer Function Bode Plot, between X-Pier and X-M2 base accelerometers, shows structural amplification of x12 at 7.5Hz, and x30 at 20Hz, and 29Hz.



Peak Ground Acceleration (PGA) vs Distance Model (Boore-Atkinson 2007)



Conclusions

- The measured accelerations at the Pier are an order of magnitude higher than expected, previous events did not show this large discrepancy, this might be indicative of a dependence of the earthquake origin location.
- The structural amplification is similar to what was measured on previous events.
- Need to obtain data from Tololo (GUC), for comparison.
- The high accelerations measured at the base of M2, need to be reduced, using dampers or base isolation, to prevent damage in the future.

