



Cross-spectra, observations and improving BiSON data

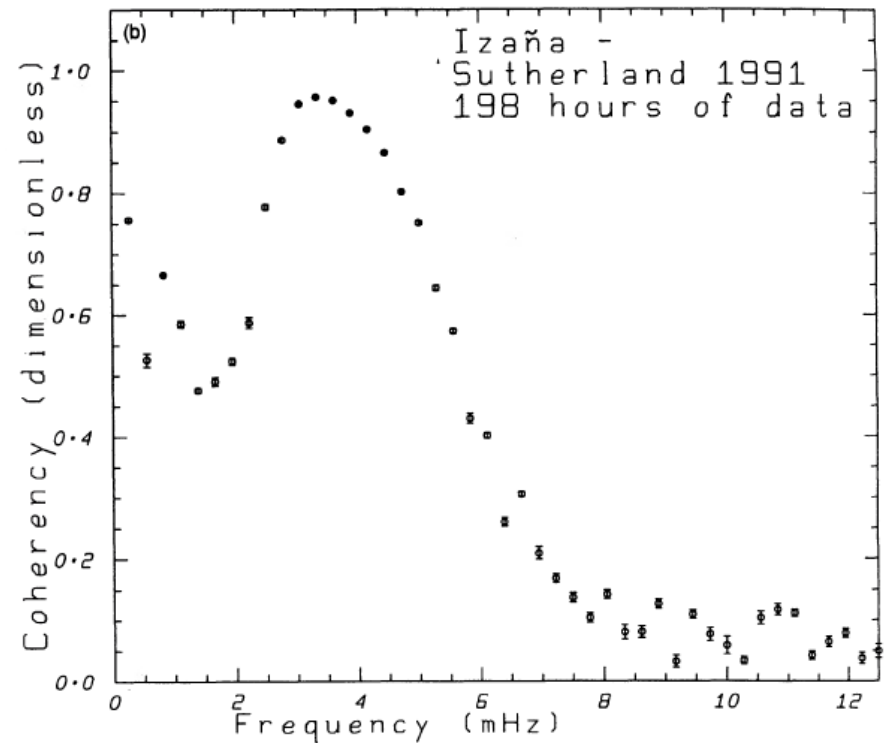
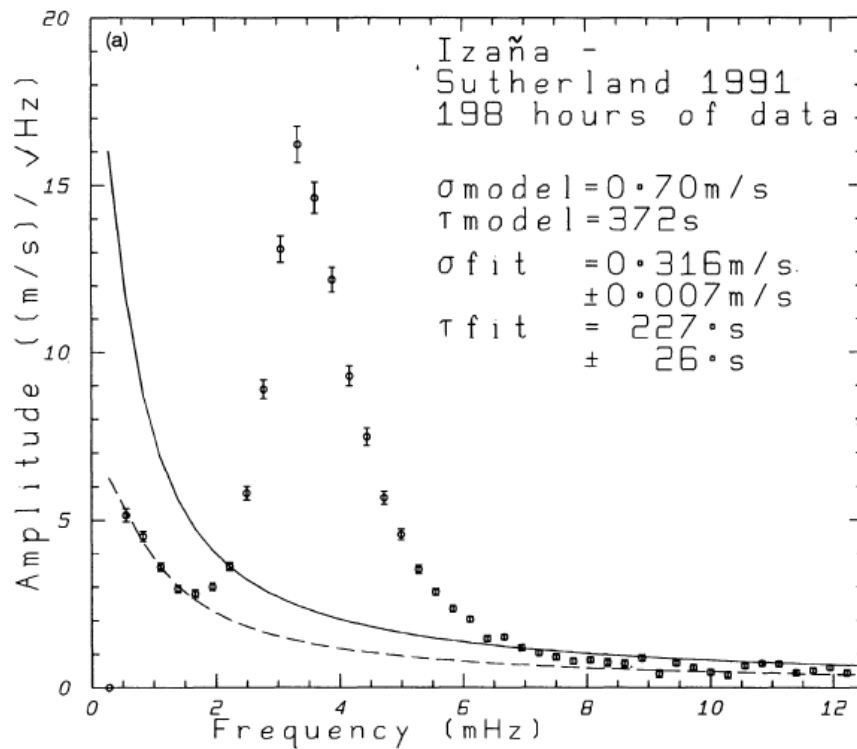
Bill Chaplin

Phoebus ISSI Workshop, Bern

March 2019

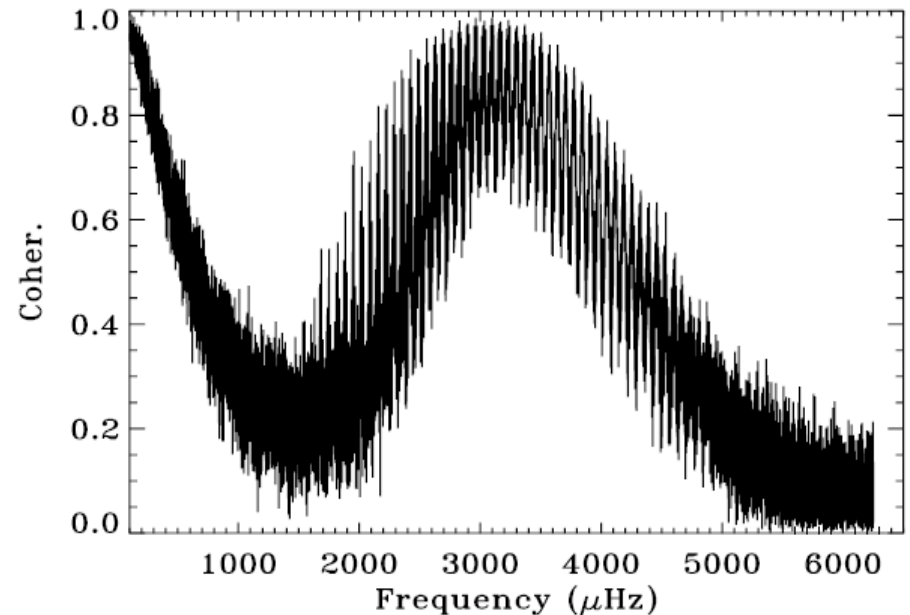
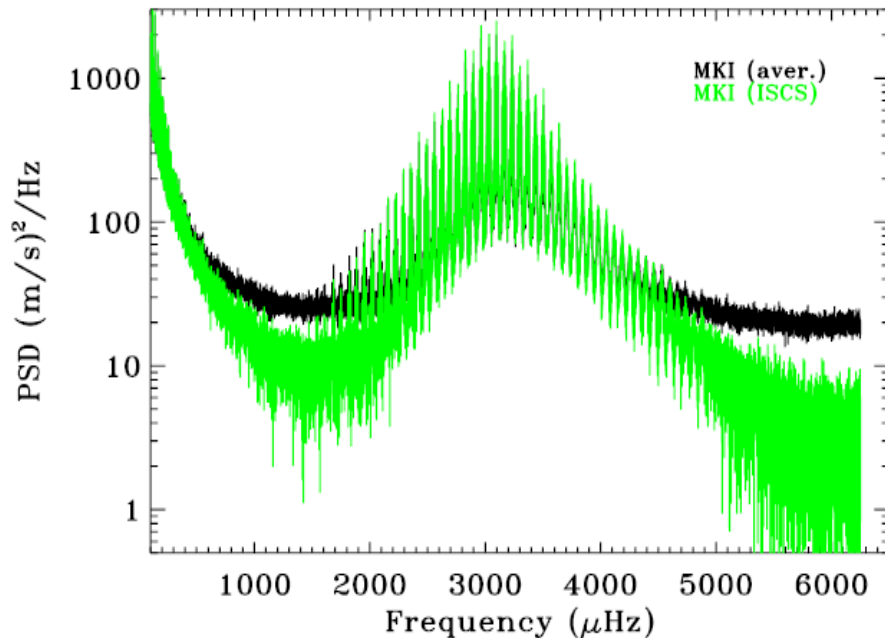
Constraining solar background

Cross spectra with BiSON data



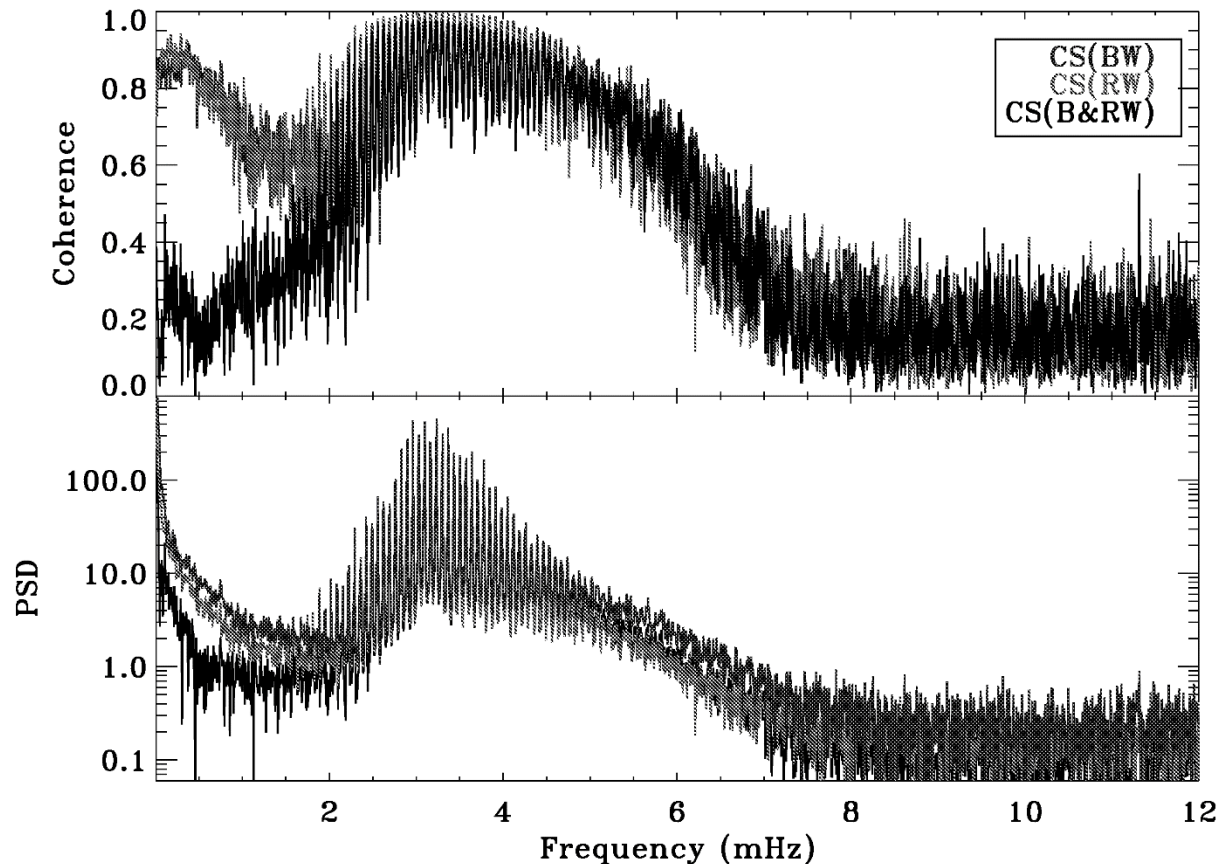
Improving SNR for mode detection

Cross-spectra of “interleaved” GOLF timeseries



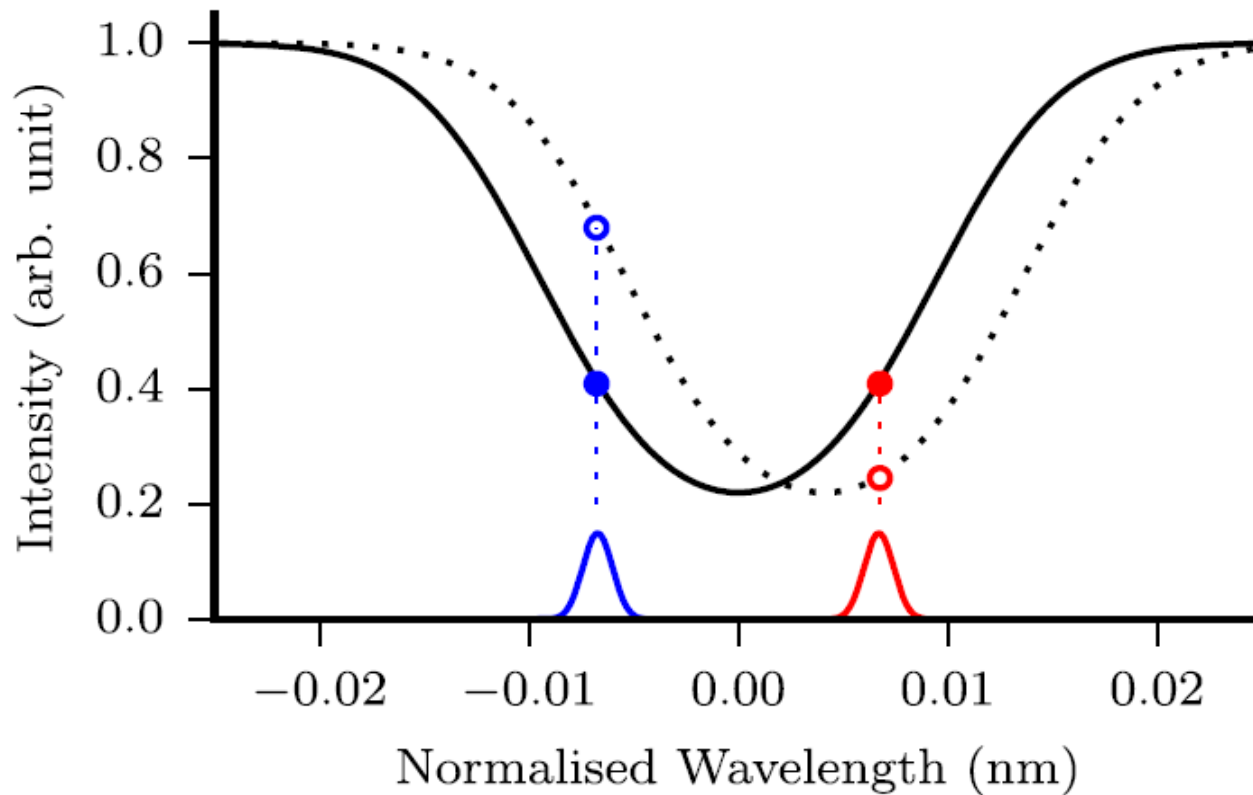
Improving SNR for mode detection

Cross-spectra of “red” and “blue” wing GOLF data



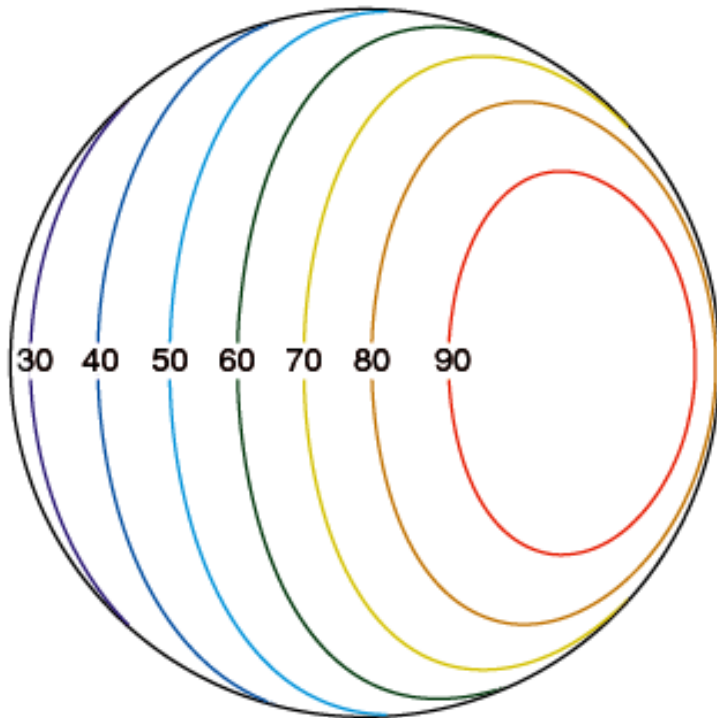
Resonance scattering spectroscopy

Narrow passbands in blue and red wings

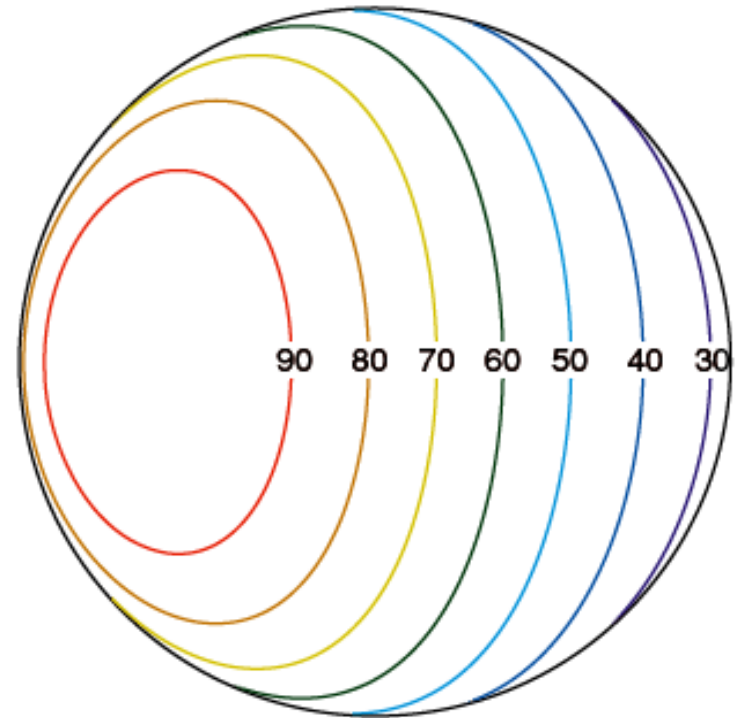


Weighting of the signal

Blue wing

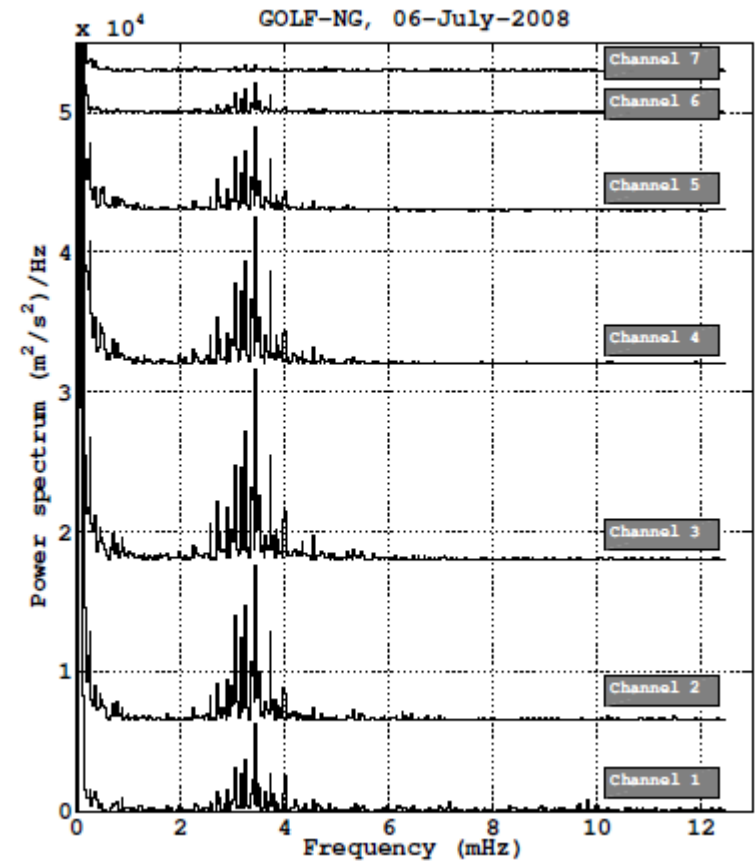
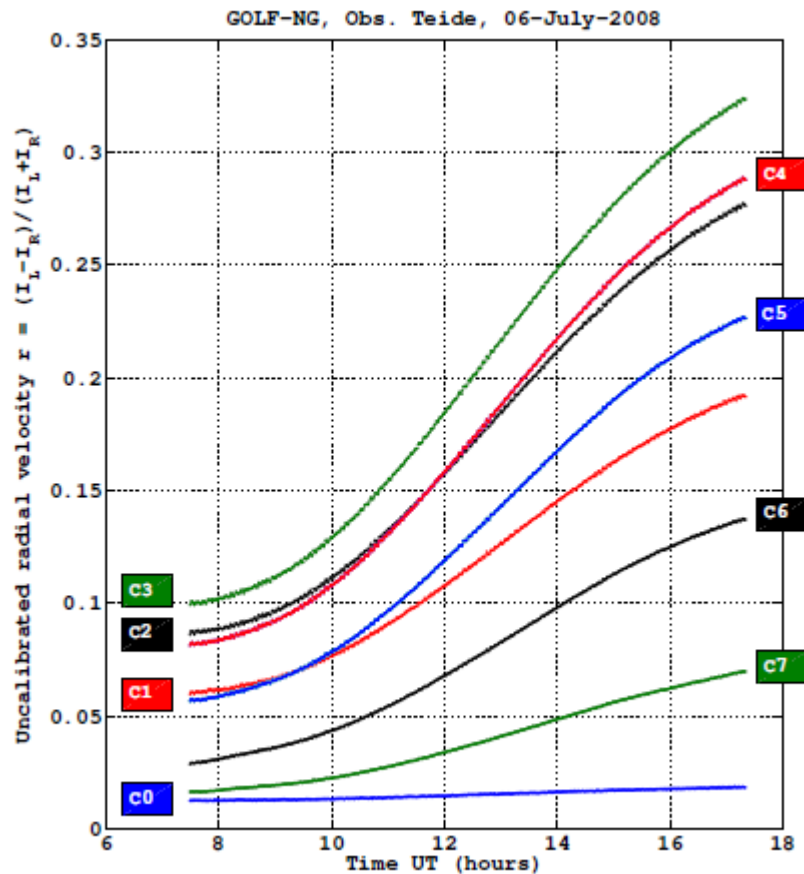


Red wing



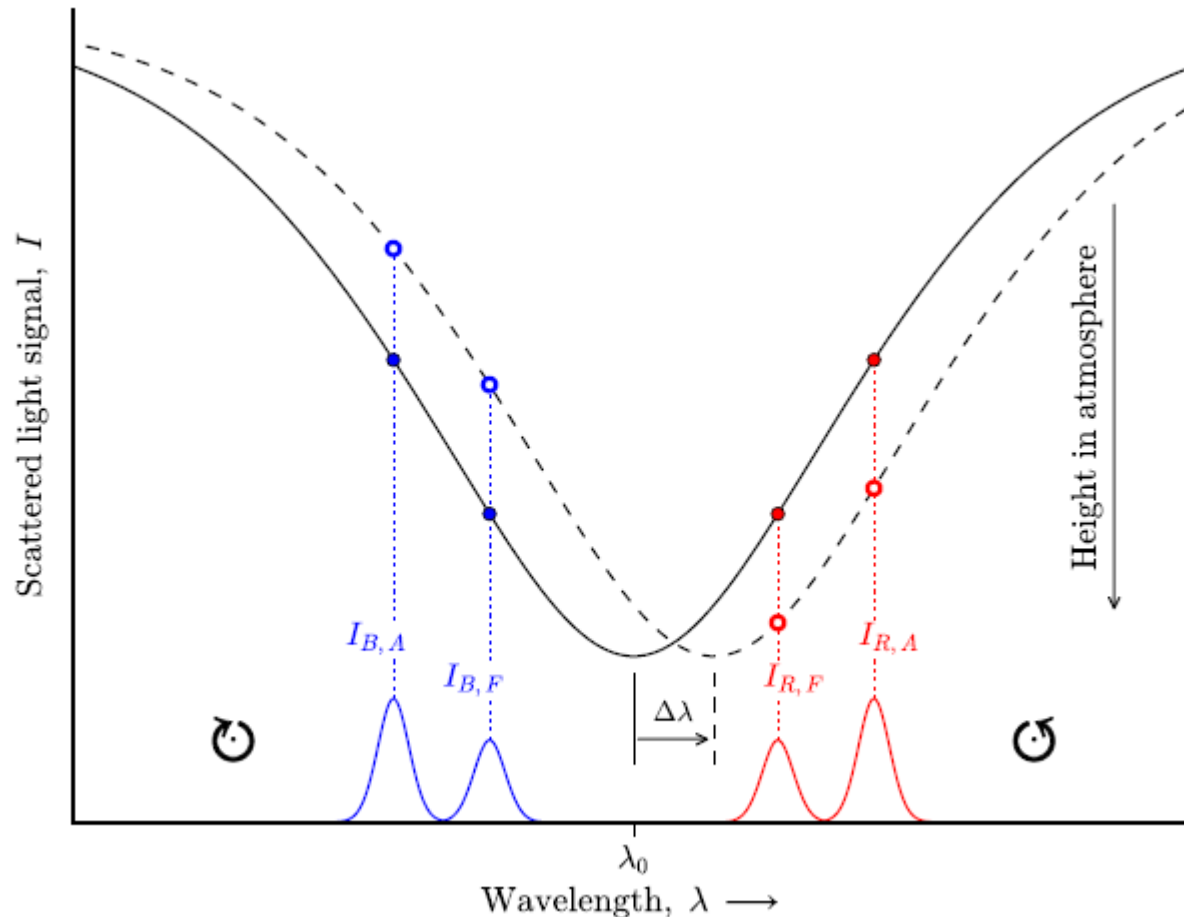
GOLF-NG

Observe at multiple heights in atmosphere



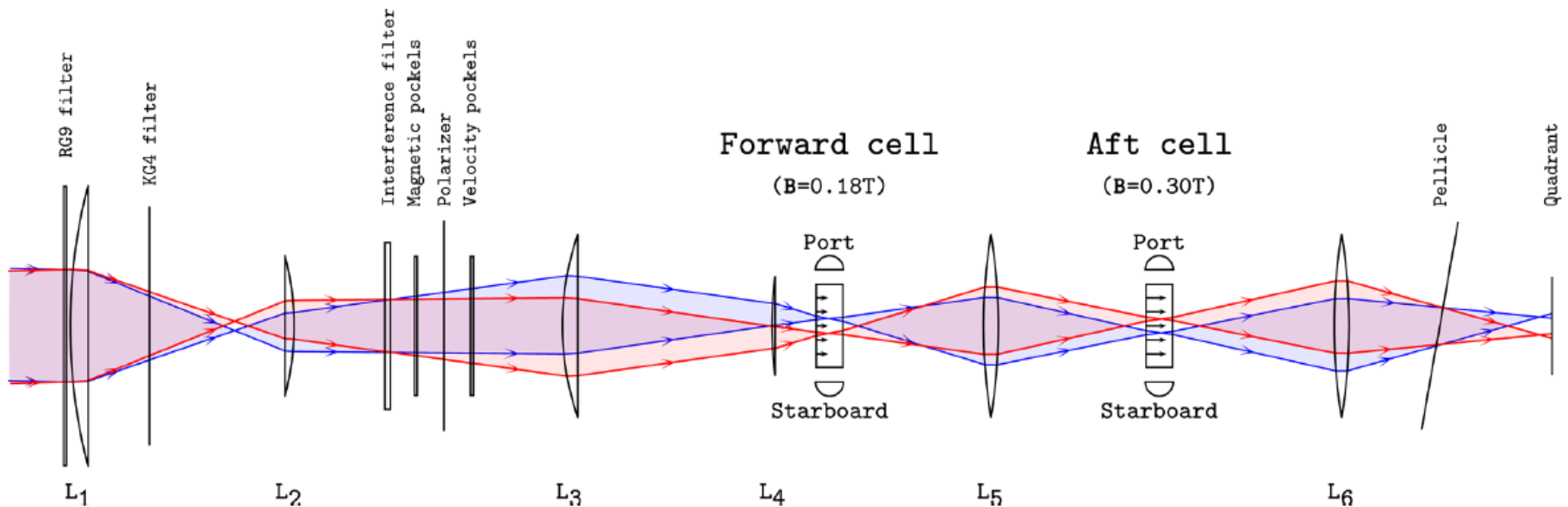
The BiSON 2-B instrument

“First light” in 1994



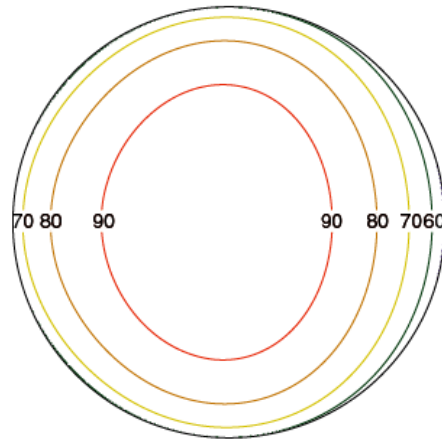
The BiSON 2-B instrument

“First light” in 1994

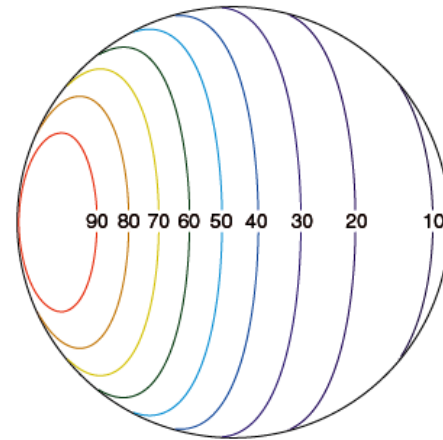


Weighting of the signal

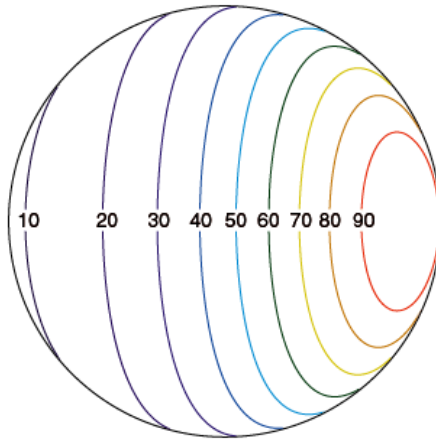
Blue
starboard



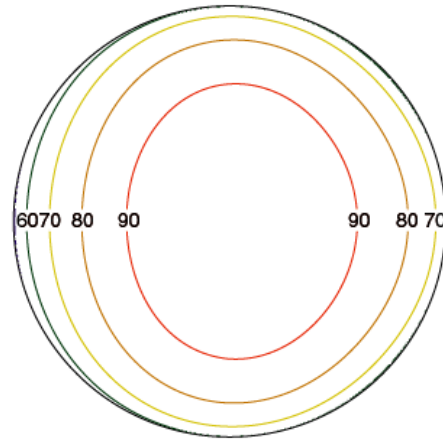
Red
starboard



Blue
port

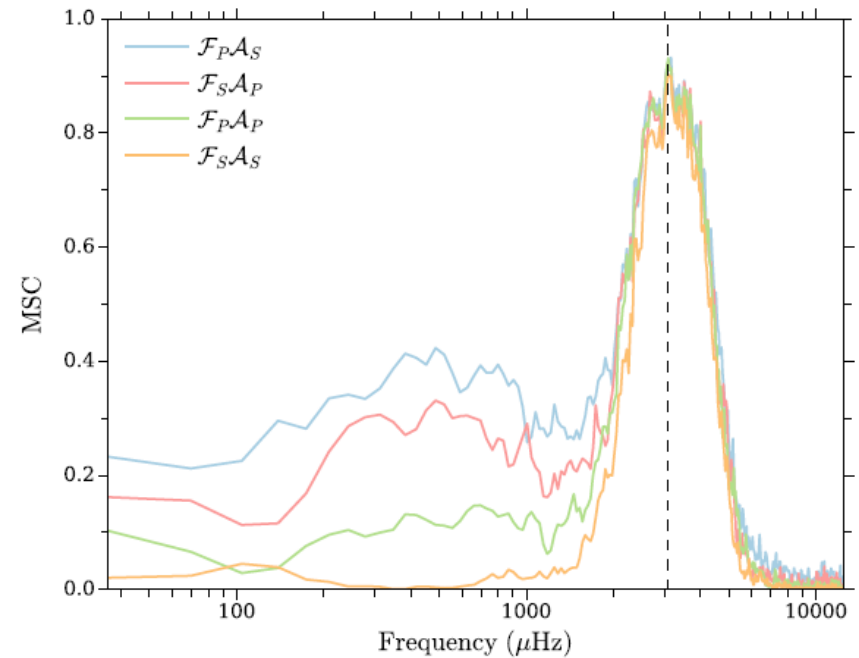
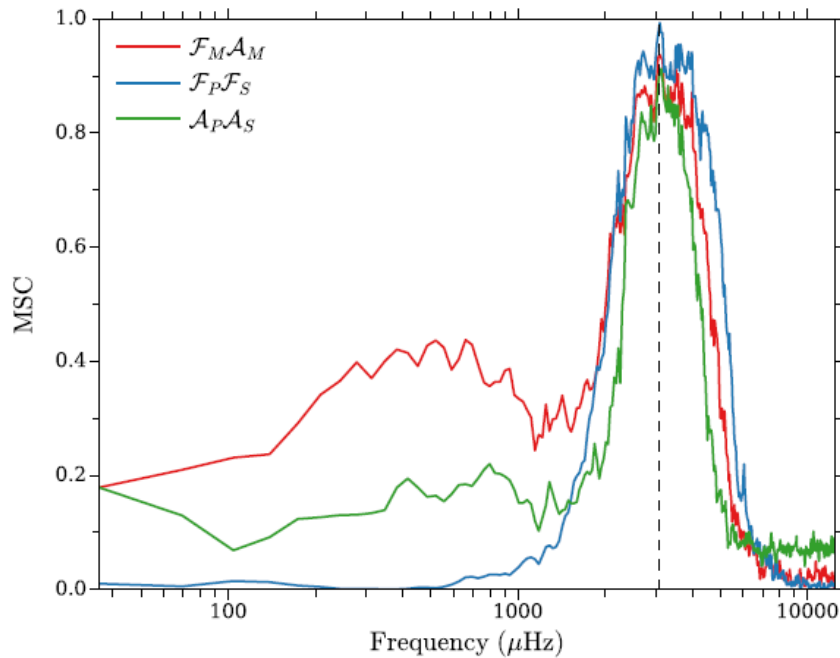


Red
port



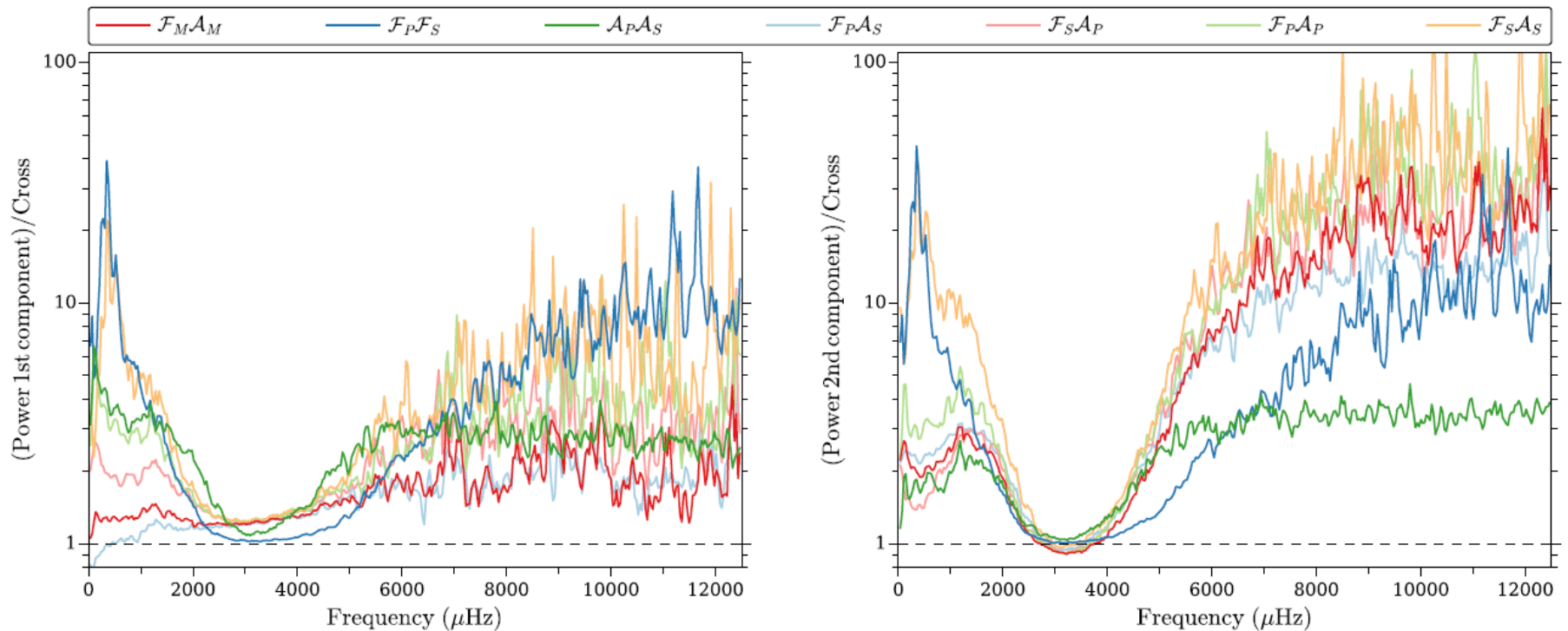
The BiSON 2-B instrument

Magnitude Squared Coherence (MSC)



The BiSON 2-B instrument

Potential Gain in SNR



BiSON-Mini

BiSON “in a suitcase”



- Aim: New suitcase-sized instruments having the same performance capability as main sites
- Significant data overlaps: beat down intrinsic stellar noise



New BiSON instrumentation

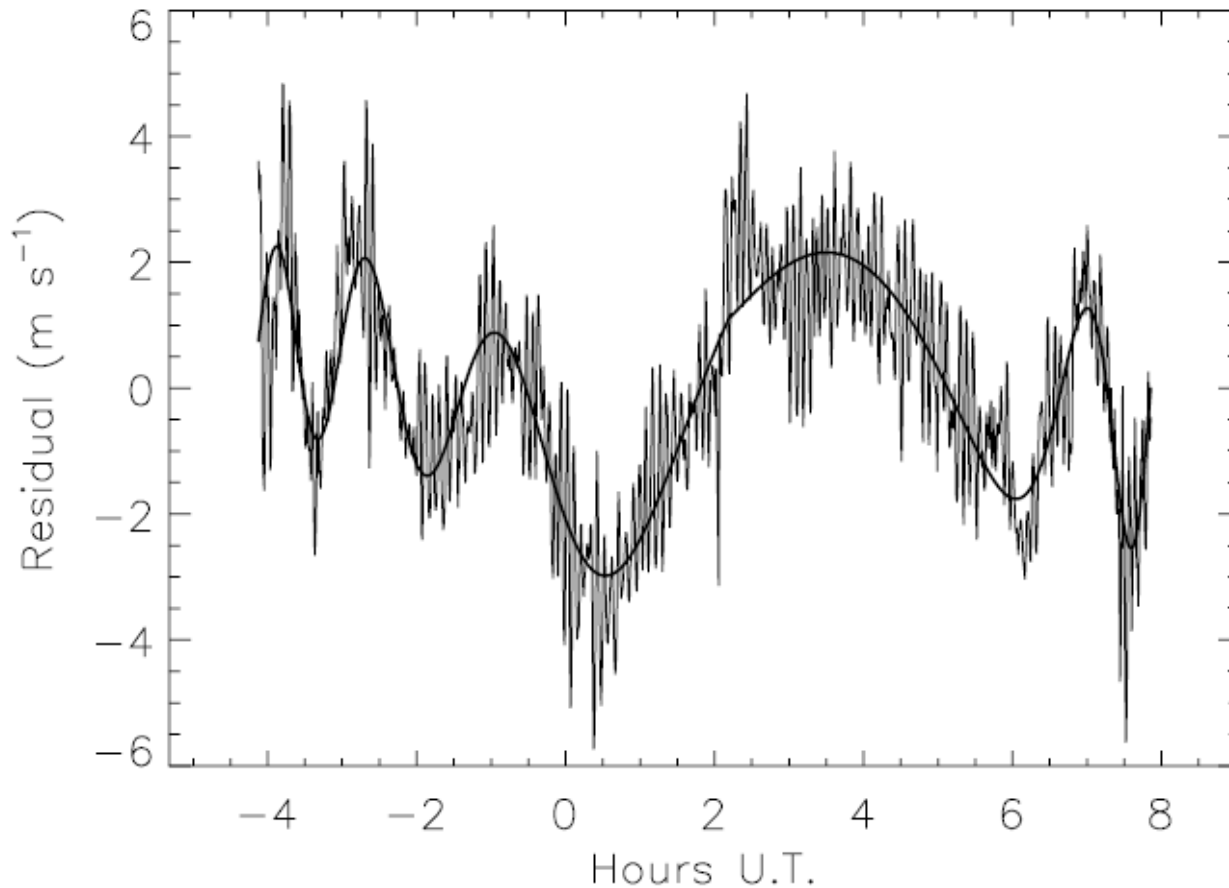
- STFC support funded through March 2021
- Continuing programme of upgrades [using STFC Impact Accelerator funds]:
 - New light-feed system *now running* at Mt Wilson and Carnarvon
 - New “BiSON-midi” spectrometer *now running* in Tenerife
 - New automated housing for Tenerife under design and construction

Tests of new fibre-feed input at Mount Wilson site



Hale et al.

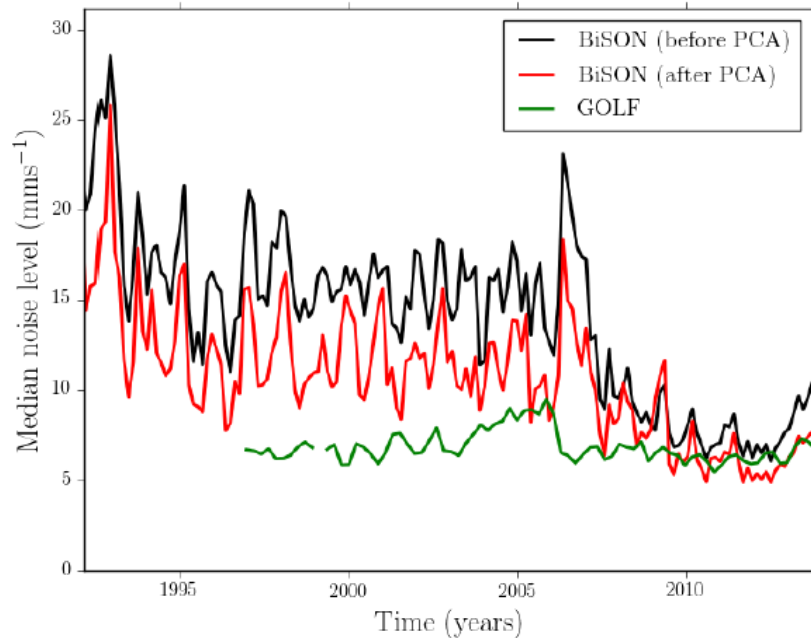
Improving low-frequency noise in BiSON



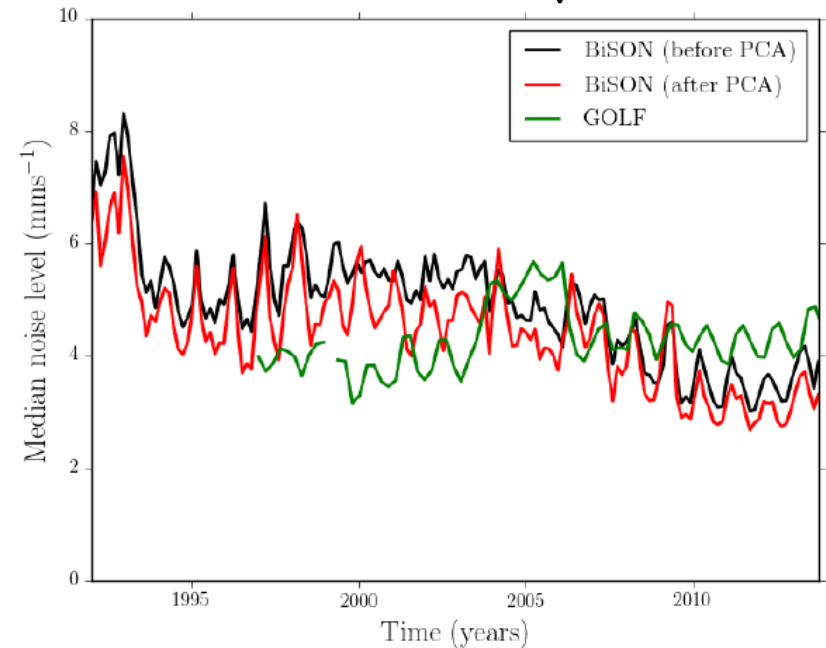
BiSON
“footprint”

Improving low-frequency noise in BiSON

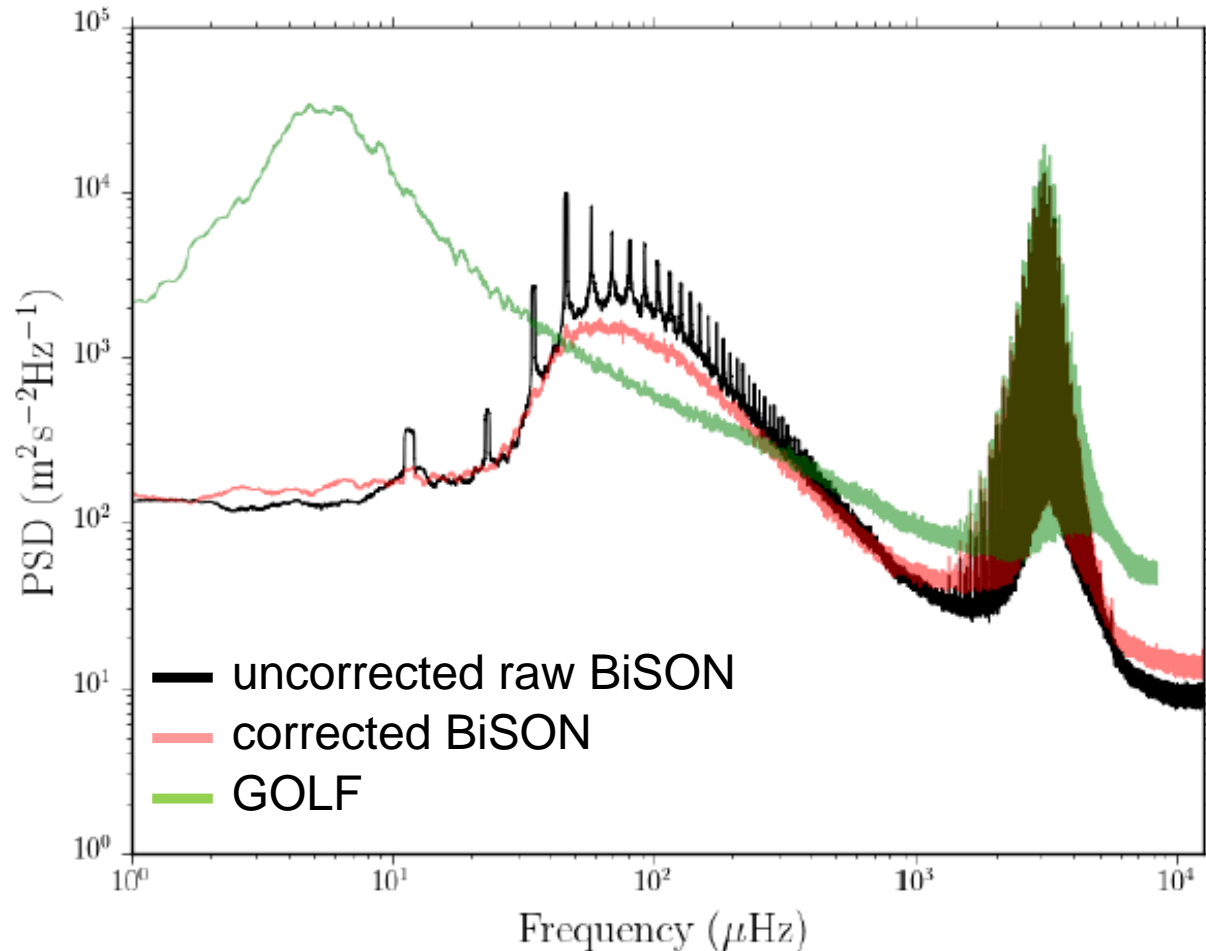
100 – 200 μHz



200 – 800 μHz



Improving low-frequency noise in BiSON



Filtering from time-series construction & window function

