

Interactive comment on “Rugged optical mirrors for Fourier-Transform Spectrometers operated in harsh environments” by D. G. Feist et al.

Anonymous Referee #2

Received and published: 6 December 2015

With the requirement to better quantify greenhouse gases, establishing TCCON stations in remote environments will be necessary. This paper discusses the problems encountered while operating a TCCON station on Ascension Island, probably the most remote and rough environments in the world for a TCCON instrument at the moment.

One of the main components of a TCCON instrument is the solar tracker, which precisely tracks the center of the sun and focuses the beam onto the interferometer. Its gold coated mirrors are exposed to ambient conditions during the measurements, making them one of the first components to degrade.

The authors presented the problems they encountered using the standard gold coated mirrors. On the search for the best solution, the authors showed different rugged mirror configurations and discussed their limitations. Finally, the authors propose using

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polished stainless steel mirrors and showed their resilience against the environment of Ascension Island.

I think this work is very important for the future operations of TCCON and NDACC stations in remote and harsh environments. This paper has the potential to be referenced numerous times by both TCCON and NDACC networks. However, as reviewer #1 already stated, the authors need to deepen the paper a bit more, specifically on the characterization of the results using the new mirrors. I recommend this paper for publication in AMT after all the comments of reviewer # 1 and a few comments below have been addressed.

Additional Comments: Figure 9 shows the measurements of the steel mirrors' reflectivity, normalized for a single reflection. I think the authors should show the same plot for a standard gold mirror, for comparison. What is the difference between the gold and stainless steel mirrors in terms of reflectivity as a function of wavelength? Also, in this figure, there is a “kink” at around 5100-5200 wavenumbers. Perhaps the authors should comment on this as well as its effect on the retrievals.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 10711, 2015.