



## Guest Investigator Final Report

*Project Title:* **Investigating LYRA Degradation**

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*Date of visit:* *From:* 04/2013                      *to:* 04/2013

*Project Abstract:*

The goal of the proposed research is to enhance the specification, characterization, and understanding of solar EUV irradiance and its variability as observed by the LYRA instrument. It addresses the calibration of the instrument and its degradation. A direct comparison of the SDO-EVE and PROBA-2 LYRA data will prove a means to directly determine the EUV degradation of the LYRA channels and also provide a calibration of the LYRA channels with Aluminum and Zirconium filters by transferring the calibration of the EVE instrument that is maintained through sounding rocket under flight campaigns. Understanding the degradation seen on both EVE and LYRA will allow us to design less degradation-prone instruments in the future.

*Primary ROB Contact(s):* Marie Dominique

*Which Instrument(s) was/were used:* LYRA

*Were other instruments used in collaboration with PROBA2?*

No

*(Optional) Description of collaboration:*

SDO-EVE, TIMED-SEE, SHOHO-SEM

*Was there a dedicated observing campaign performed or planned?*

No

*(Optional) Description of campaign:*

*Brief Description of work performed during the visit:*

We have investigated the possible sources of contamination that could have produced the degradation seen in the LYRA instrument. It appears that the degradation can largely be explained by a two-component model containing contamination from Silicon and Carbon (Figure 1). We traced the probable source of these contaminants to an RTV, (and possibly an epoxy) in the LYRA cover mechanism. As SWAP does not use the same cover mechanism, this might explain why SWAP does not see similar degradation. We have not yet optimized the model to find the specific thicknesses of the C and Si components as a function of

time. This will be done using early mission data, and then the LYRA irradiance can be corrected for the degradation and the change in spectral response due to the contamination.

*Future Plans:*

Optimise the degradation model, and provide corrected, time dependent LYRA bandpasses and irradiances

*Has this work been published?*

Planned

*If so, Where? Reference/DOI? ADS Link?*

*Please add below any other comments you might have:*

This has been a fantastic experience: to be able to focus on a specific problem, and hopefully provide an answer, and certainly provide feedback to produce better instruments in the future

*Any additional images:*

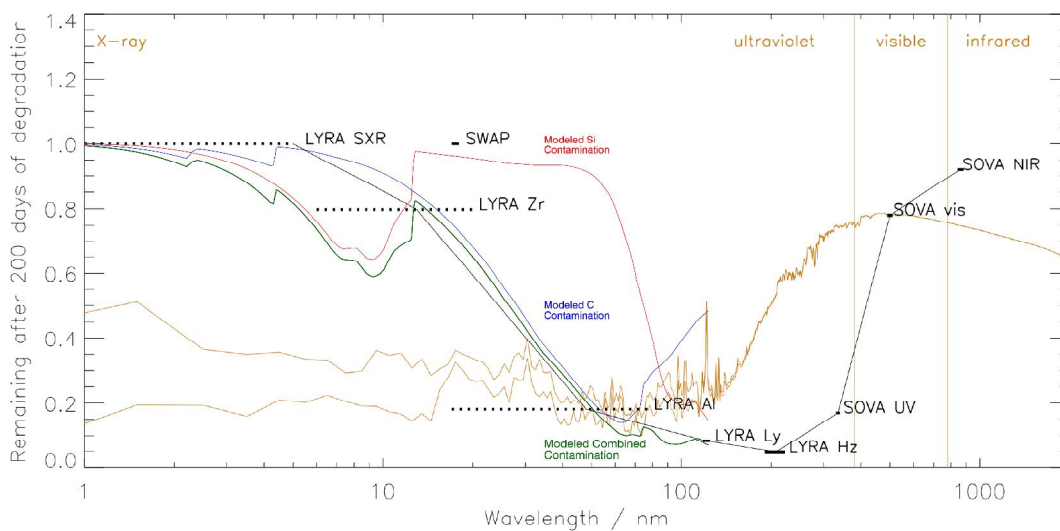


Figure 1: Over plot of modeled contamination components and the observed degradation of the LYRA channels produced by Ingolf Dammasch