



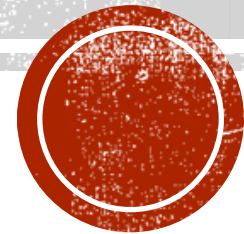
École Doctorale d'Astronomie & Astrophysique
d'Île-de-France



Laboratoire d'Études Spatiales et d'Instrumentation en Astrophysique



TRITON'S STELLAR OCCULTATION ON THE 5TH OCTOBER 2017



Joana Marques Oliveira

Observatoire de Paris

Largest of Neptune's satellites

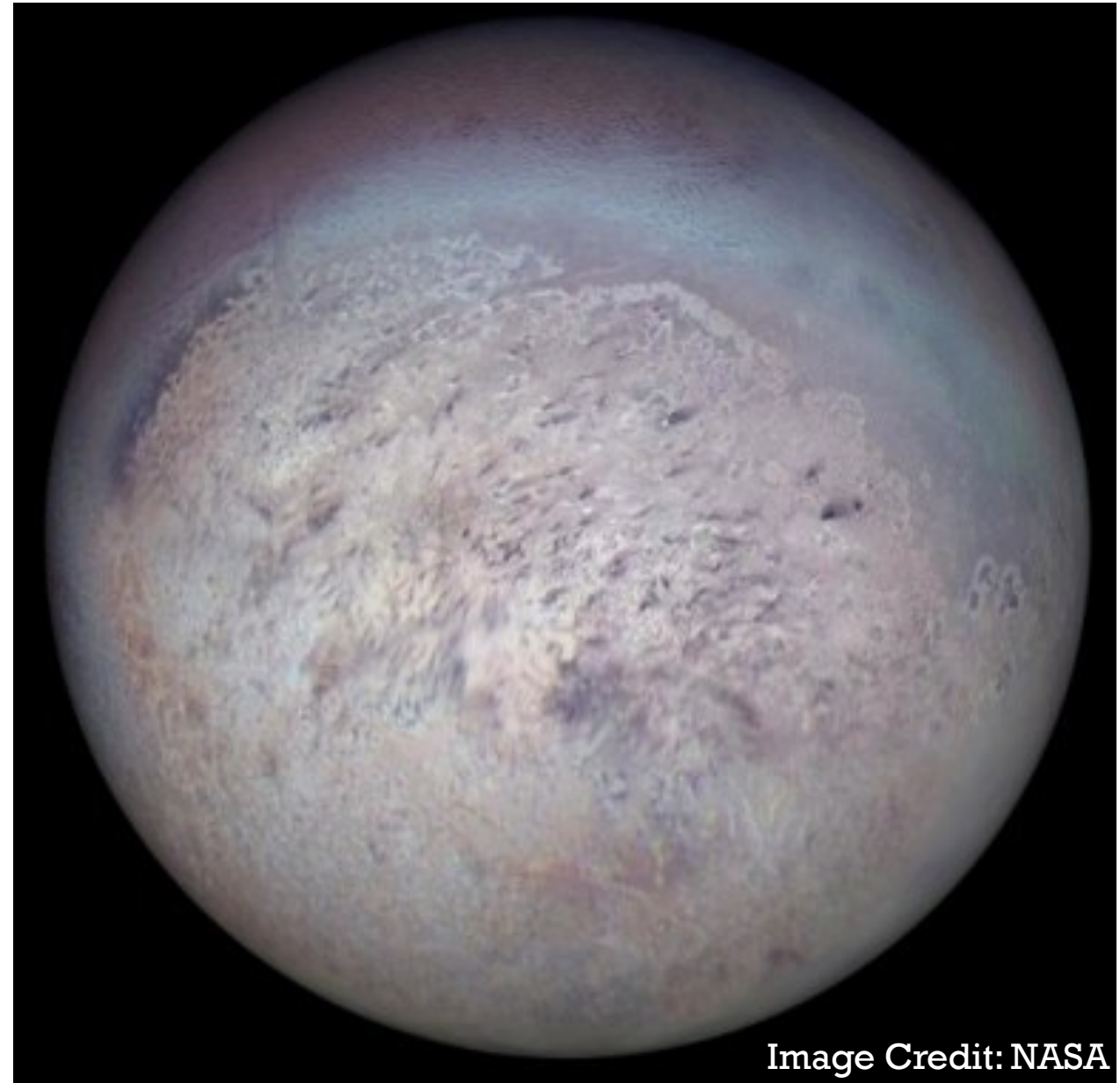
Radius - 1353 km

Possesses an atmosphere

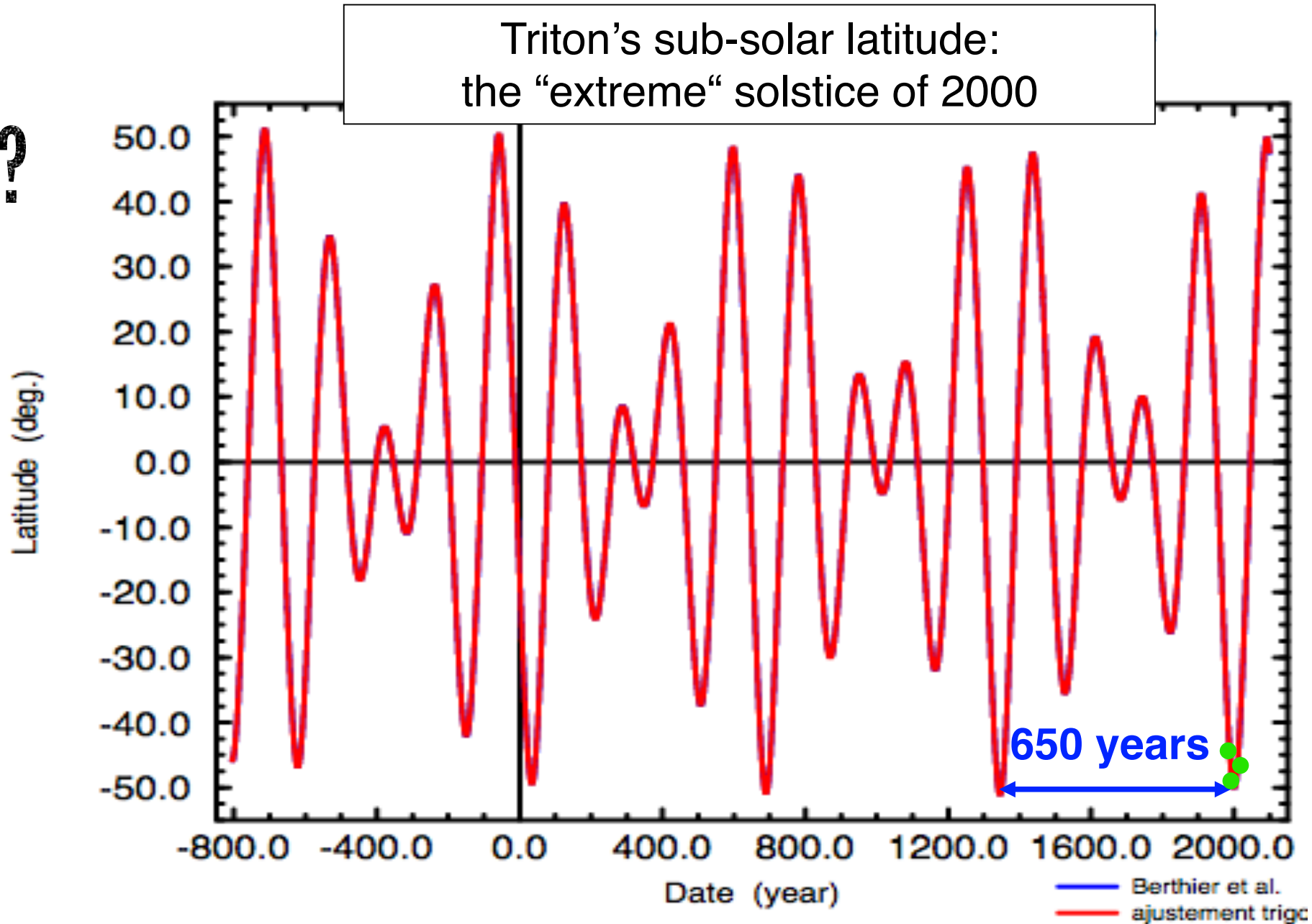
Mainly composed of N_2

It is in vapor pressure equilibrium with the N_2 frost at the surface

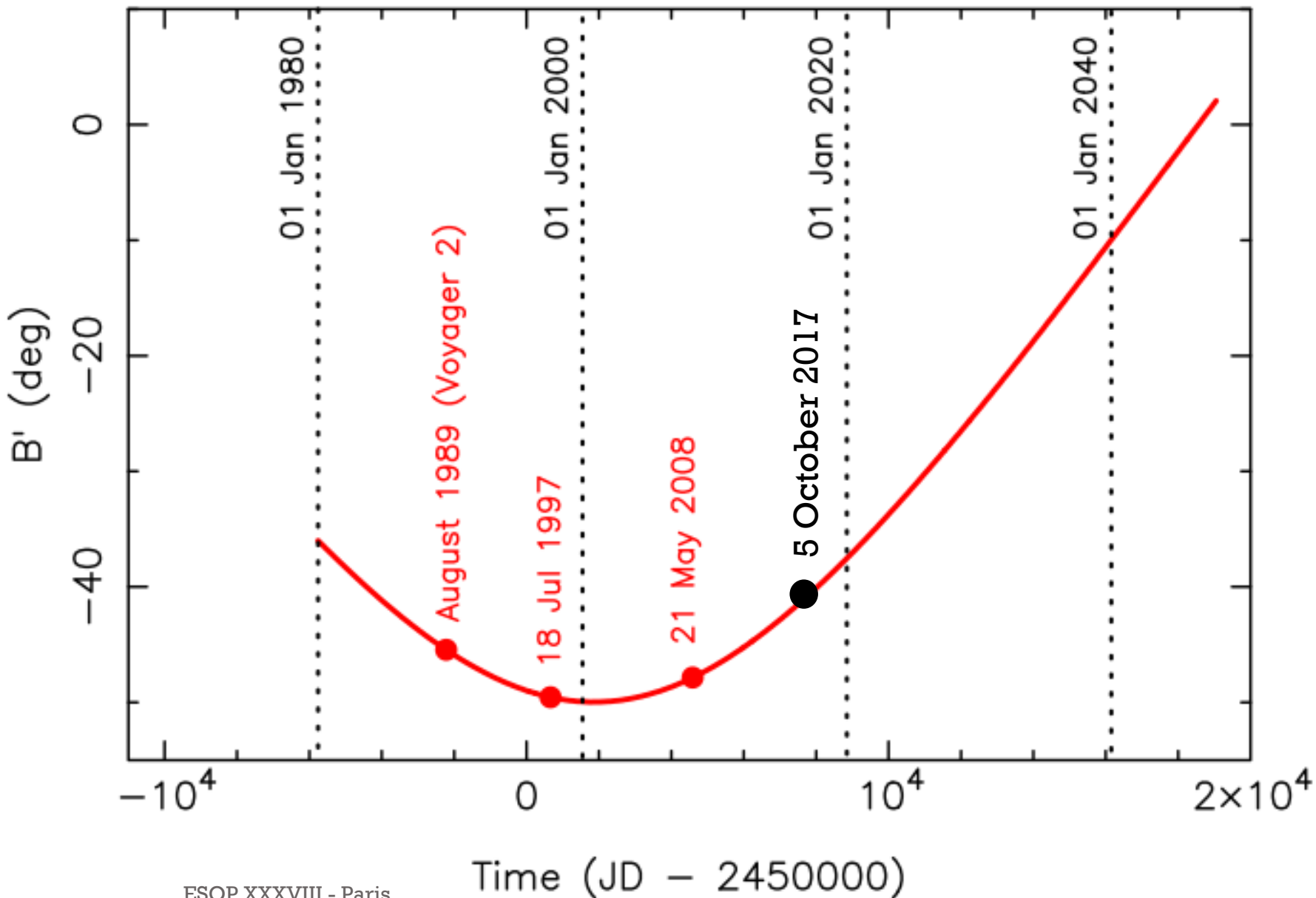
$p_{\text{surf}} \sim 16 \mu\text{bar}$, $T_{\text{surf}} \sim 40 \text{ K}$ in 1989



WHY?

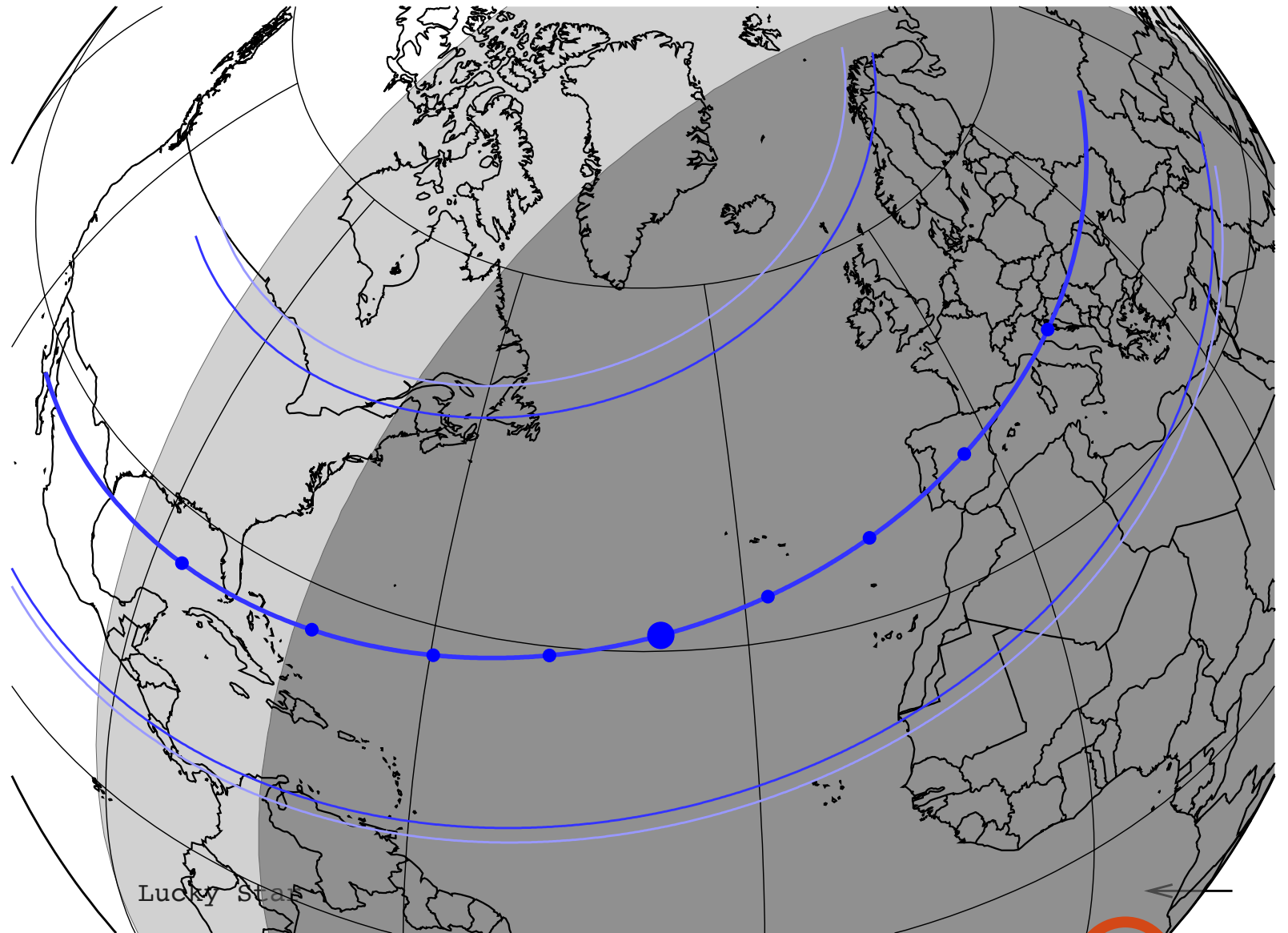


Triton sub-solar latitude B'



Did Triton's atmospheric pressure change during this extreme solstice?

PREDICTION

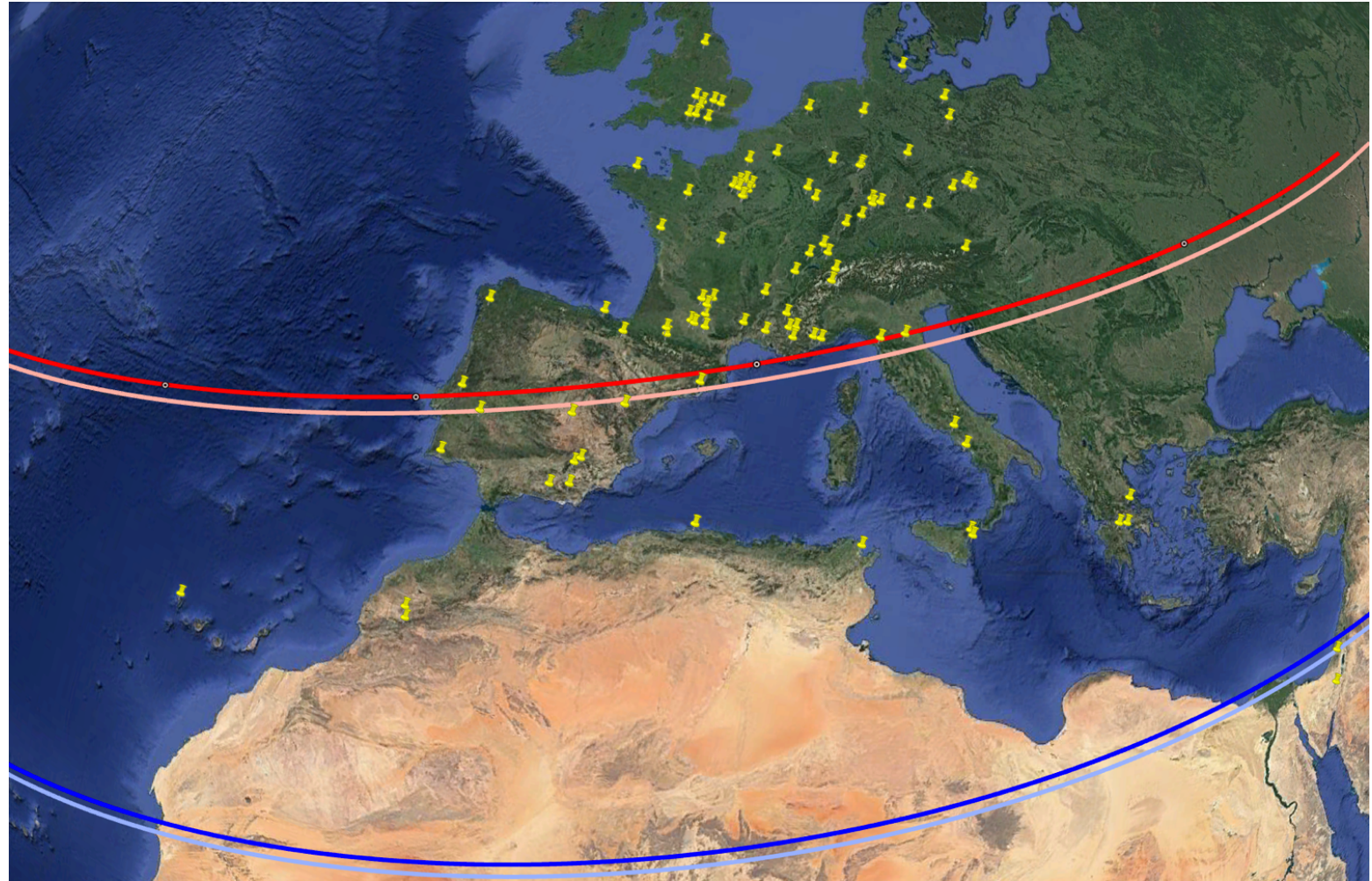


dd mm yyyy hh:mm:ss.s	RA_star_J2000	DE_star_J2000	C/A	P/A	vel	Delta	G*	J*
2017-10-05 23:51:36.5	22 54 18.4364	-08 00 08.318	0.195	347.50	-16.80	29.0807	12.0	11.0

1 September 2019

OBSERVATIONS

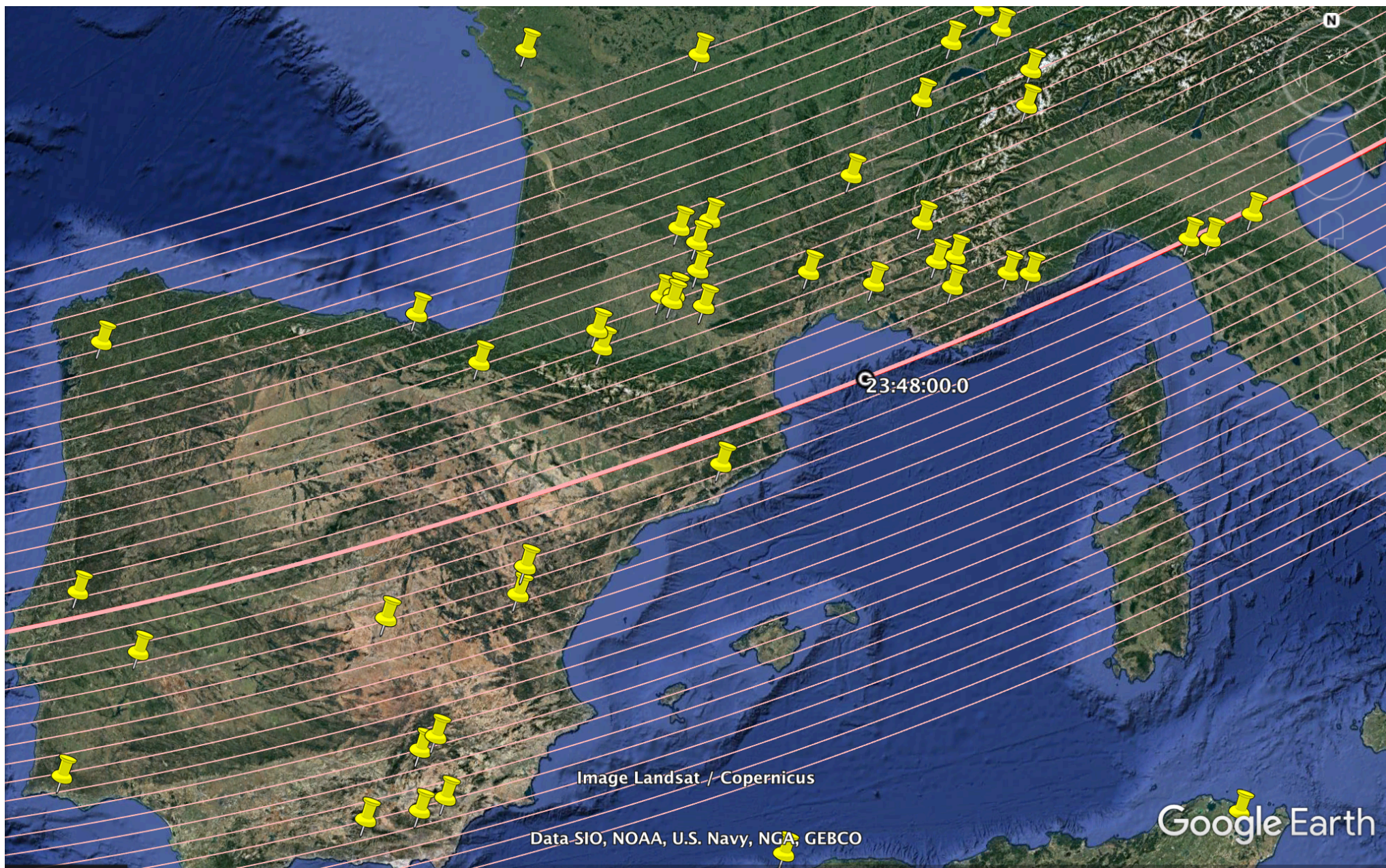
85 observations
reported!



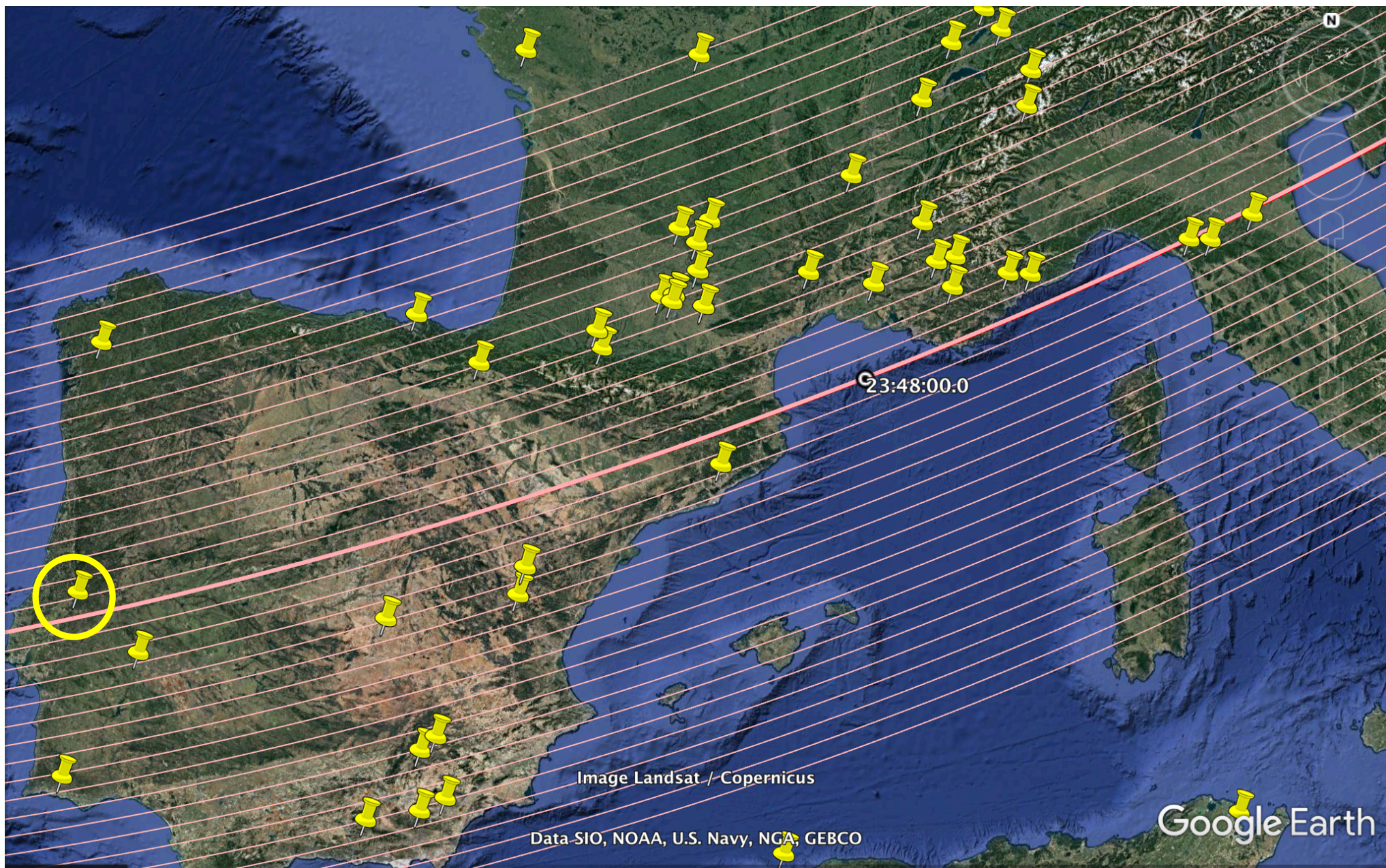
Courtesy of: Google, INEGI, ORION-ME; annotation: Lucky Star project

Gaia Press Release:

<http://sci.esa.int/gaia/60011-chasing-a-stellar-flash-with-assistance-from-gaia/>



Courtesy of: Google, INEGI, ORION-ME; annotation: Lucky Star project

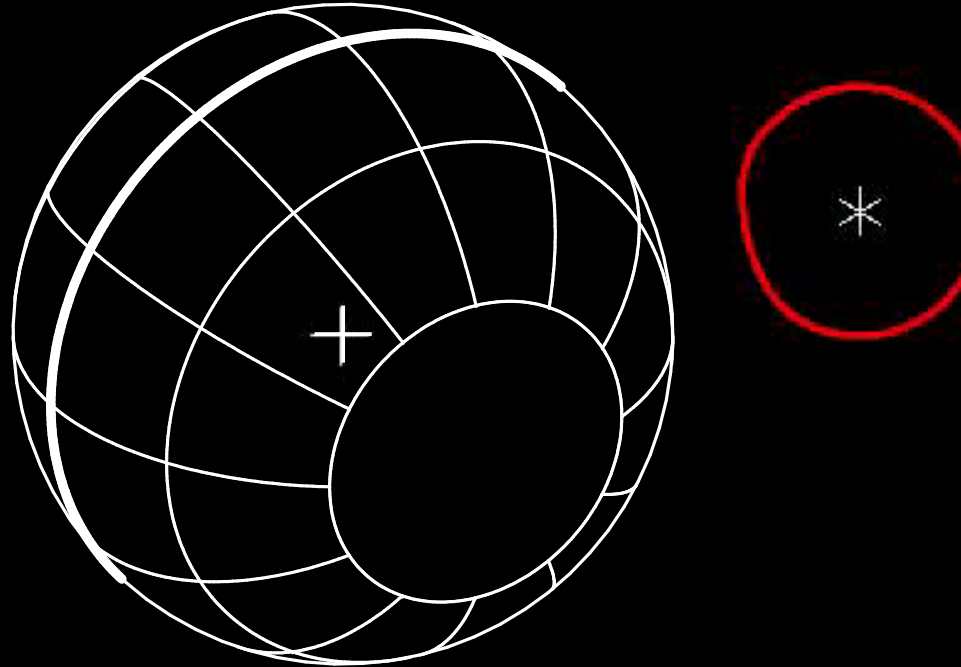


Courtesy of: Google, INEGI, ORION-ME; annotation: Lucky Star project

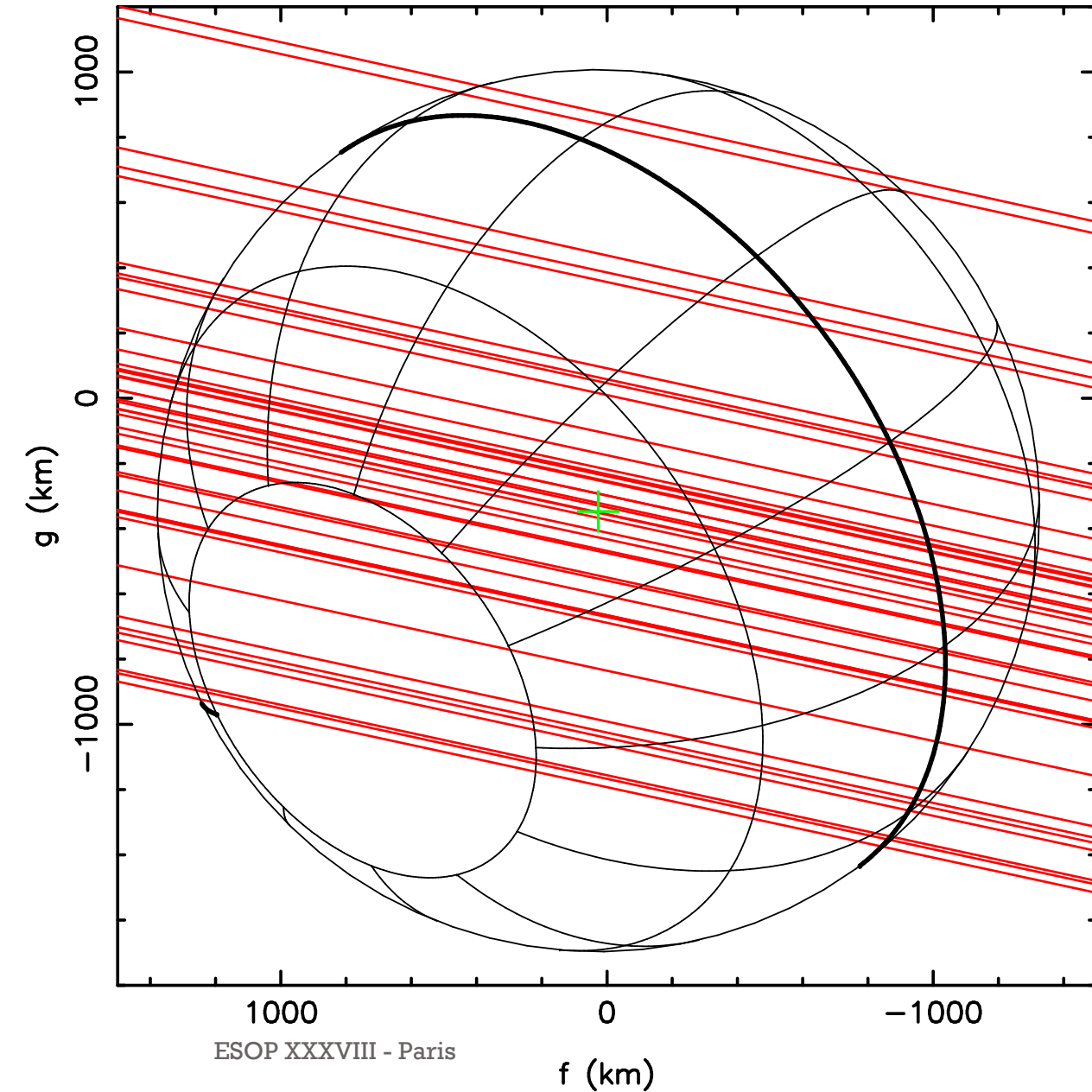


Courtesy of: Rui Gonçalves (observations) and Erick Meza (data analysis)

primary image



secondary image



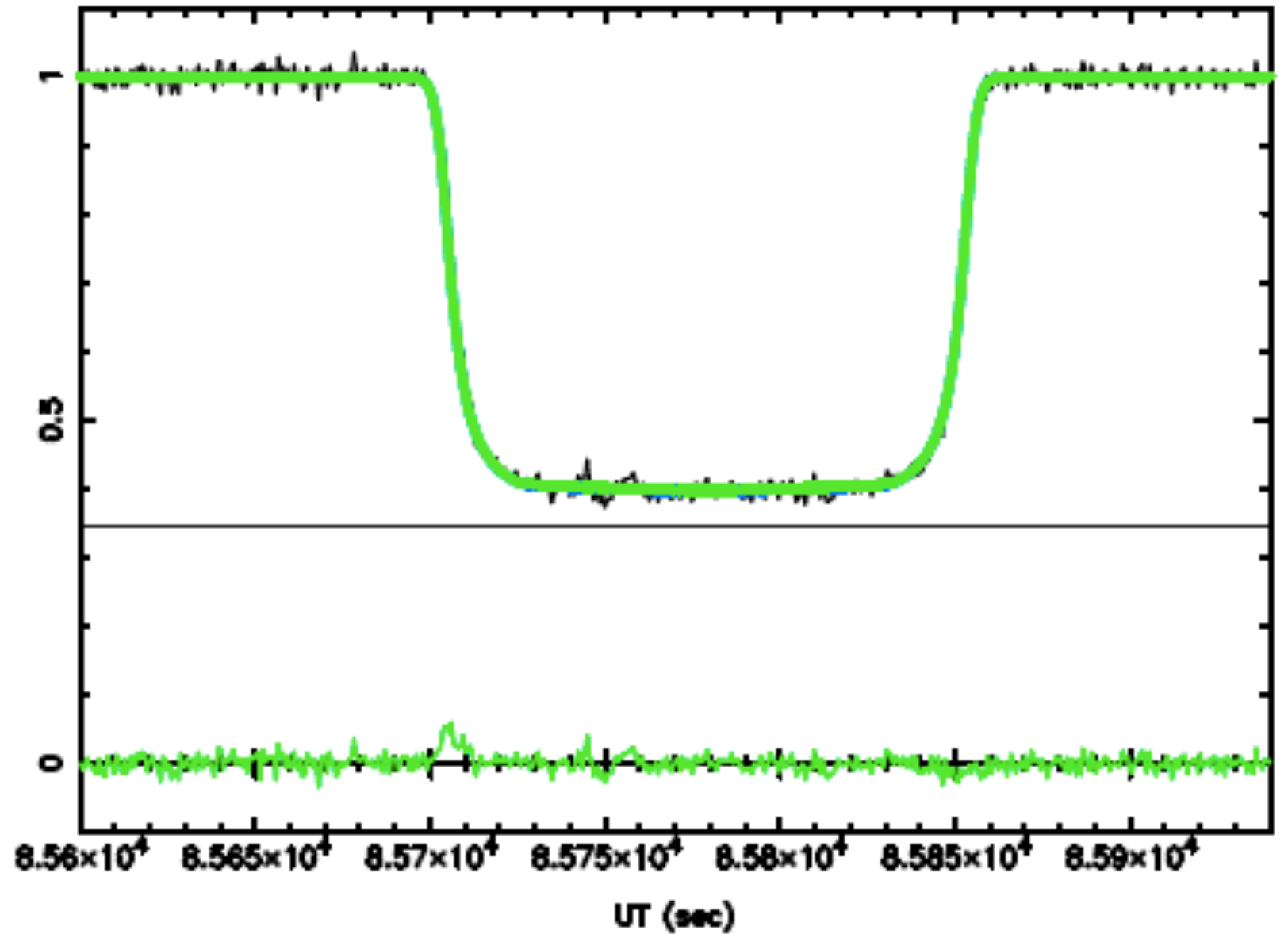
Occultation chords for 49 stations

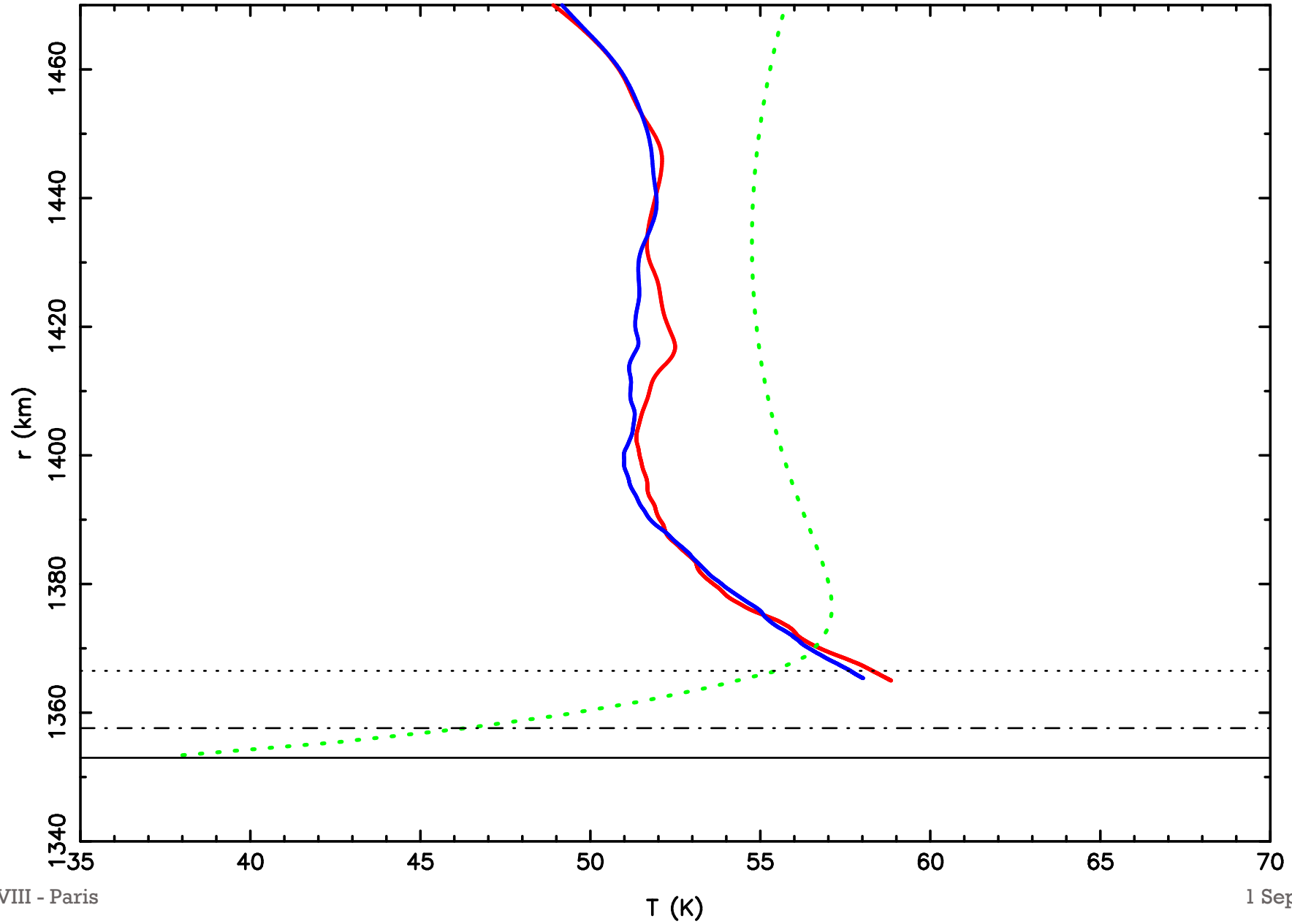
Coverage of summer and winter hemispheres

Includes stations in the same locations => study in different wavelengths

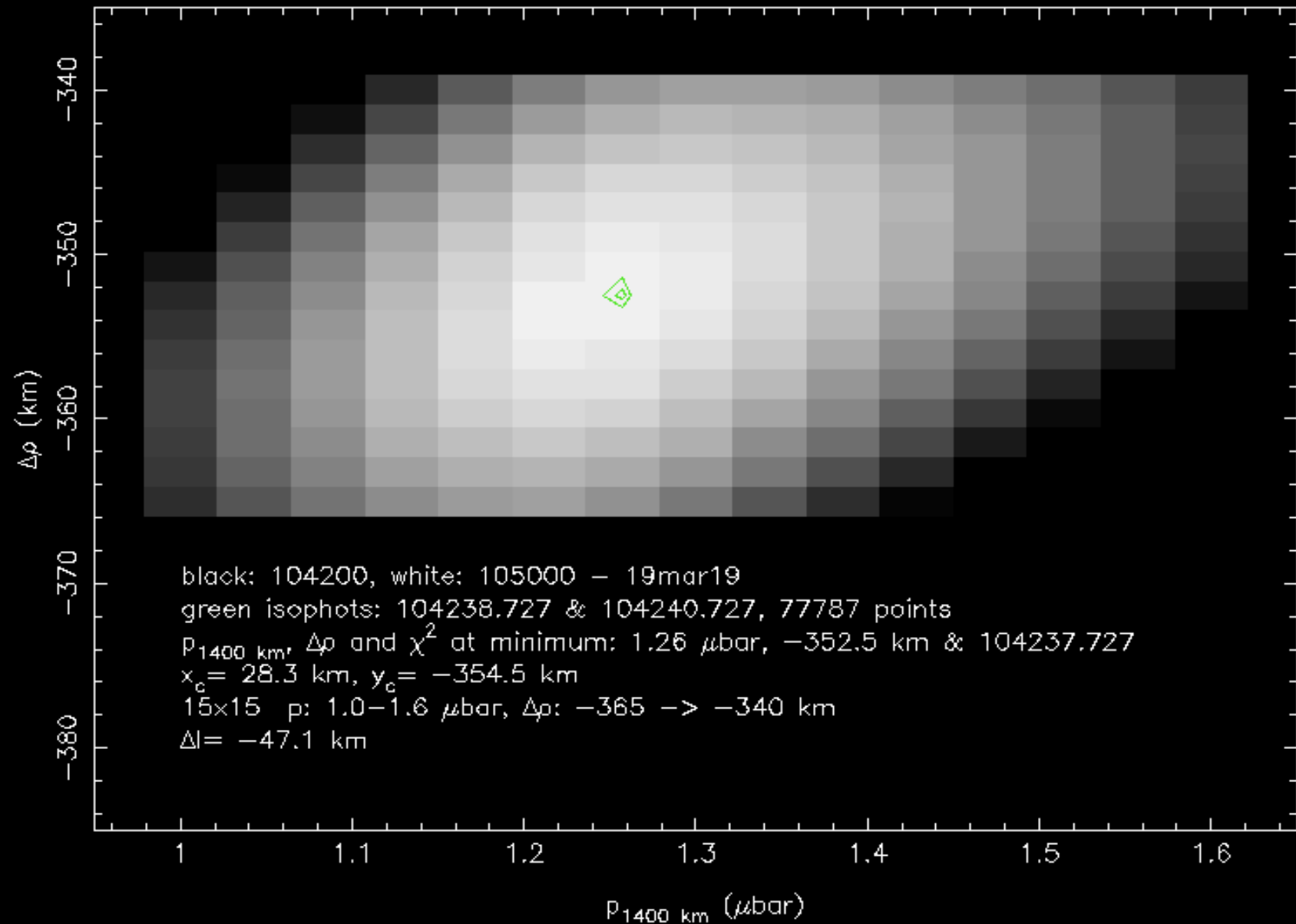
RESULTS

Inversion method
used for the
Liverpool telescope
in La Palma

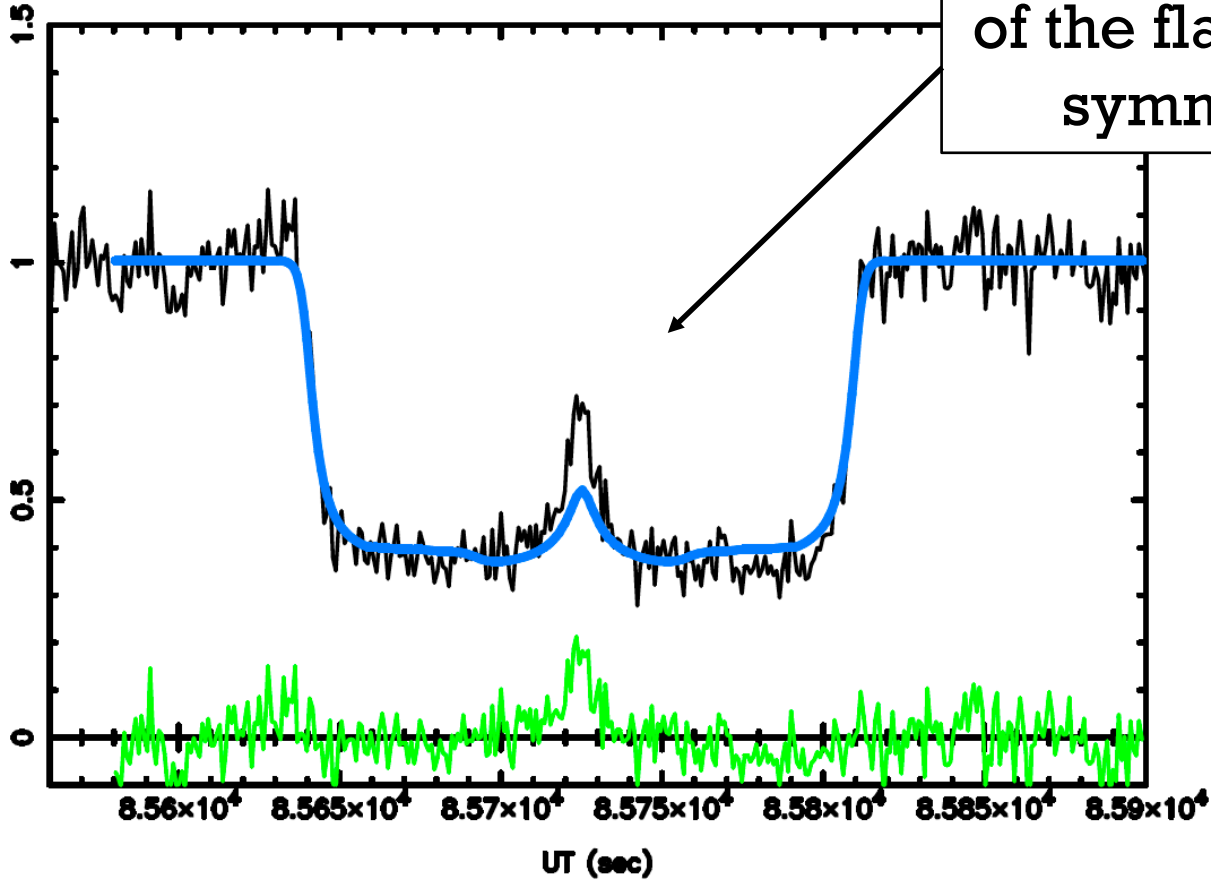




Center = -352.5 km
 $P_{1400 \text{ km}} = 1.26 \mu\text{bar}$

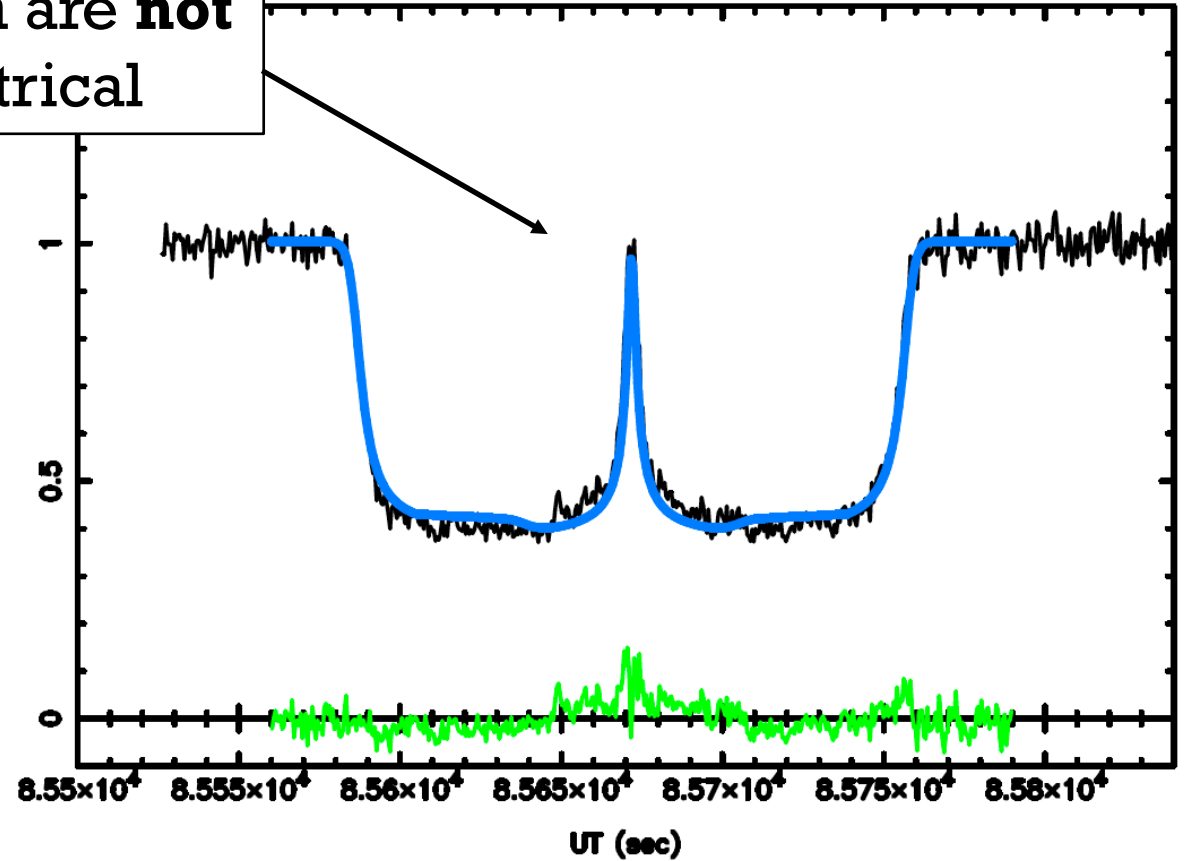


Triton 5 October 2017, Elvas



The southern and northern parts of the flash are **not** symmetrical

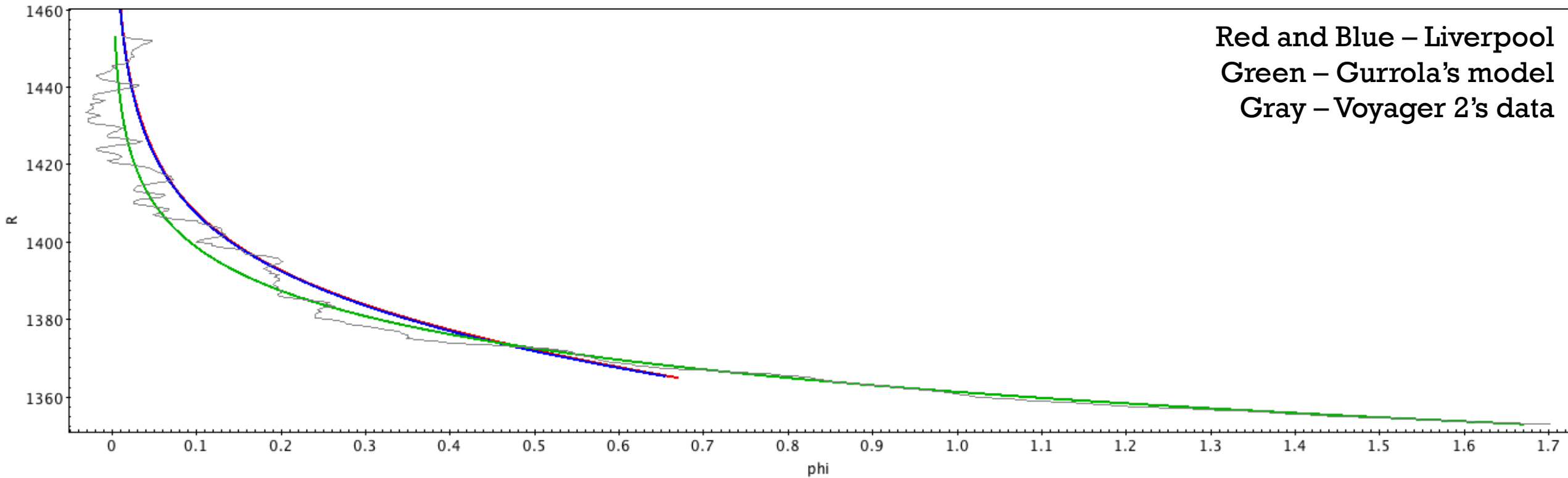
Triton 5 October 2017, Calern

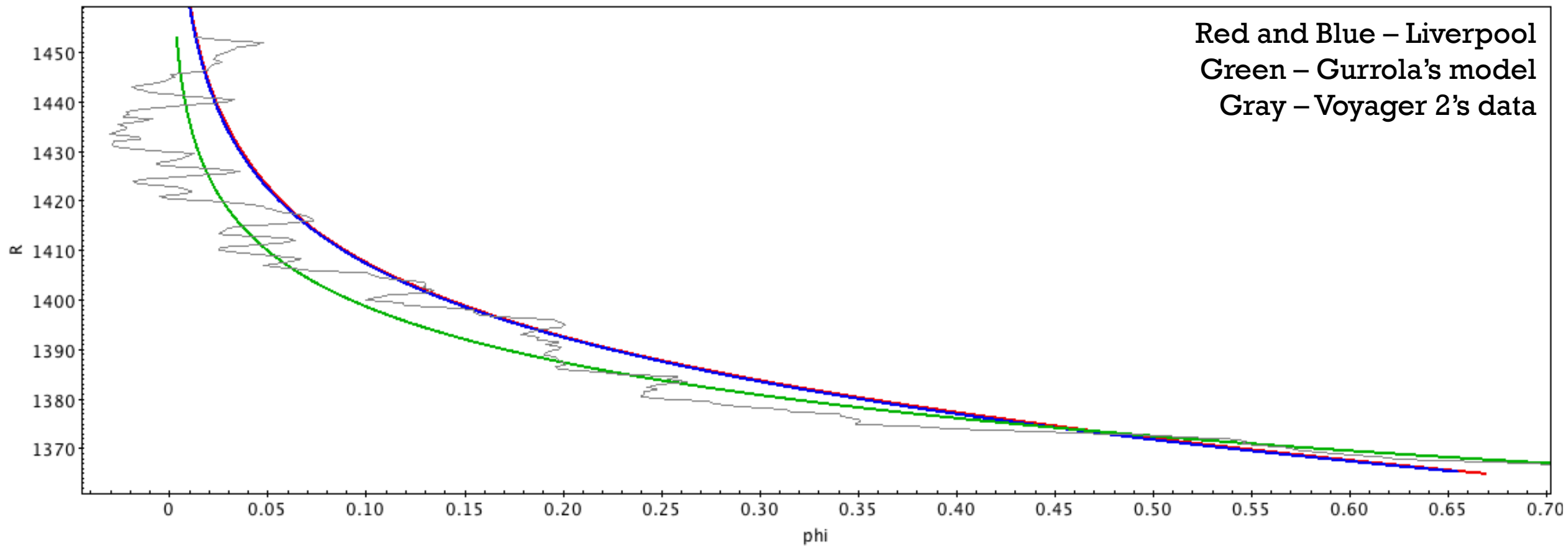


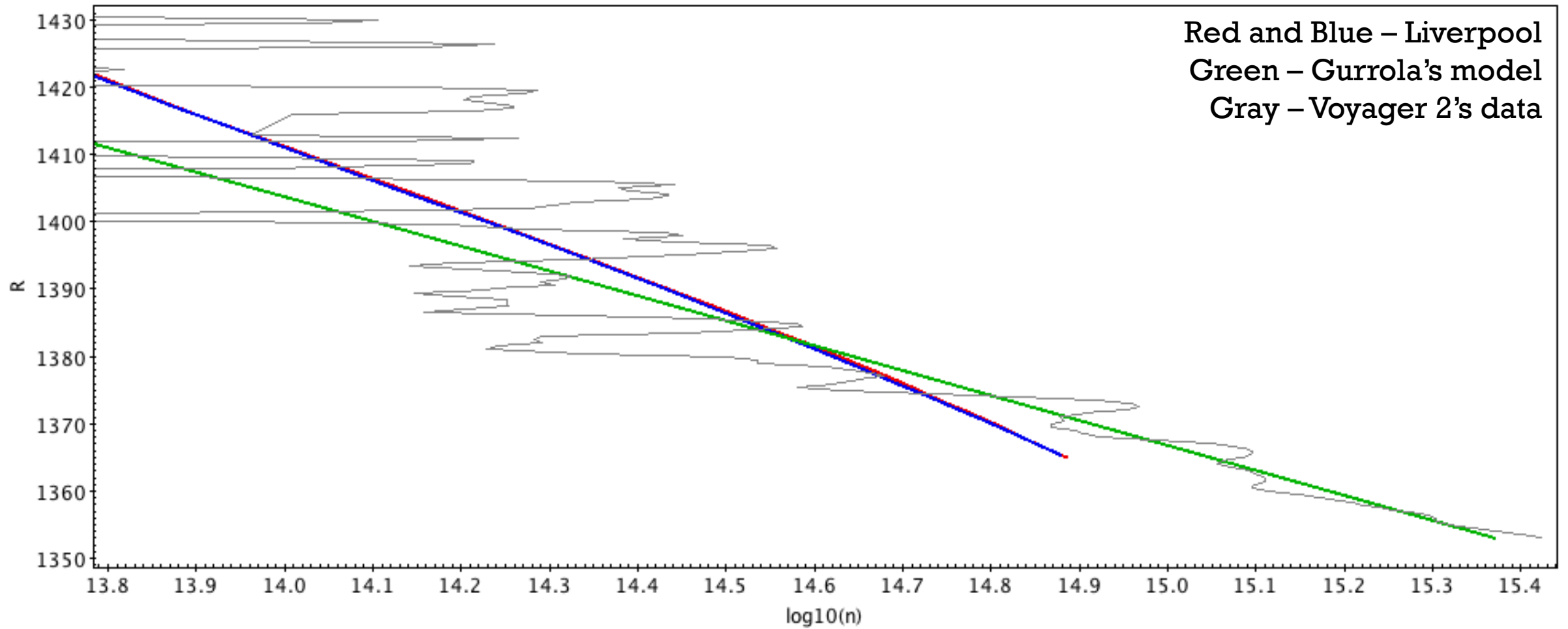
Courtesy of: Wolfgang Beisker (observations and data analysis)

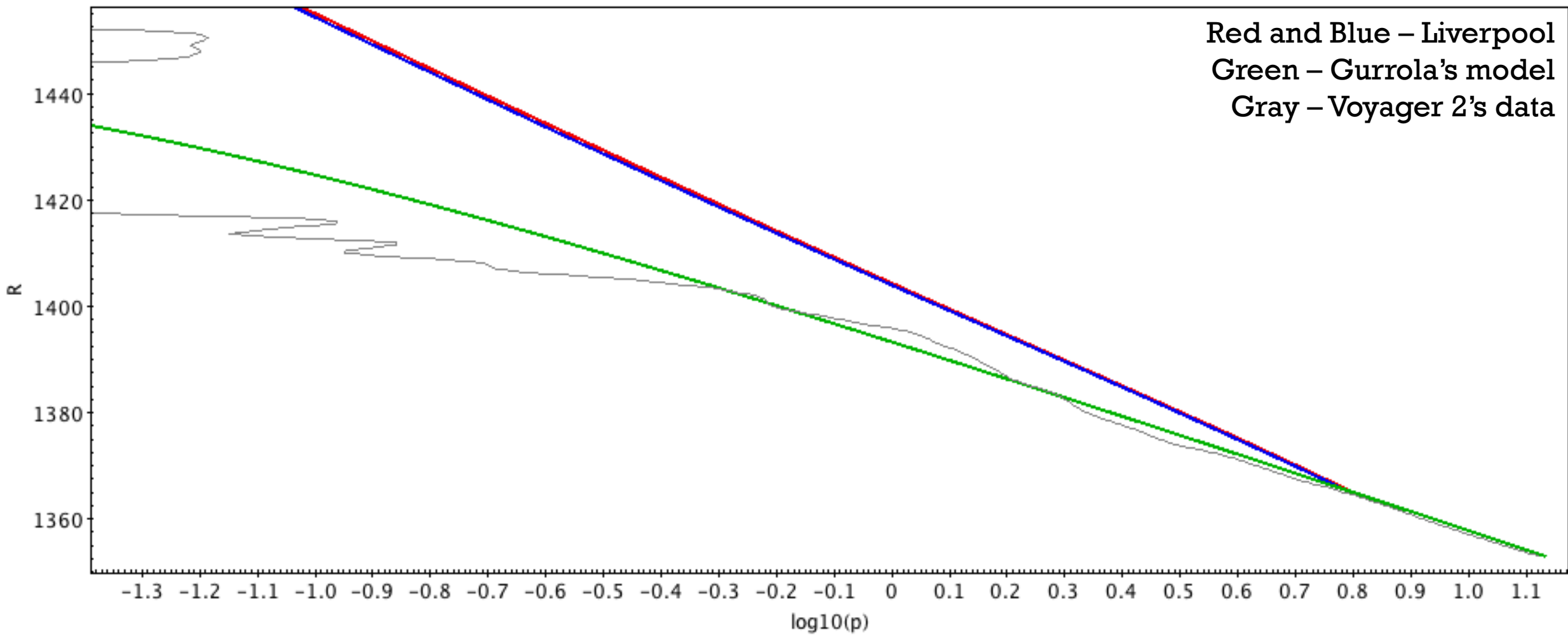
Courtesy of: João Ferreira, Pedro Machado, Paolo Tanga, Jean-Pierre Rivet (observations) and Bruno Sicardy (data analysis)

COMPARISON WITH VOYAGER 2









CONCLUSIONS

- Successful campaign
 - ~ 85 observations
- Spherical atmosphere
 - Possible asymmetry in central flash layer
- Different shape in temperature profile from previous models
- Good agreement with Voyager 2 data
- Increase in pressure to be reassessed

THANK YOU!

Acknowledgements:

This work has received support from the Portuguese Foundation for Science and Technology (FCT) through the PhD grant SFRH/BD/131700/2017.

The work leading to this results has also received funding from the European Research Council under the European Community's H2020 2014-2020 ERC grant Agreement n°669416 "Lucky Star".