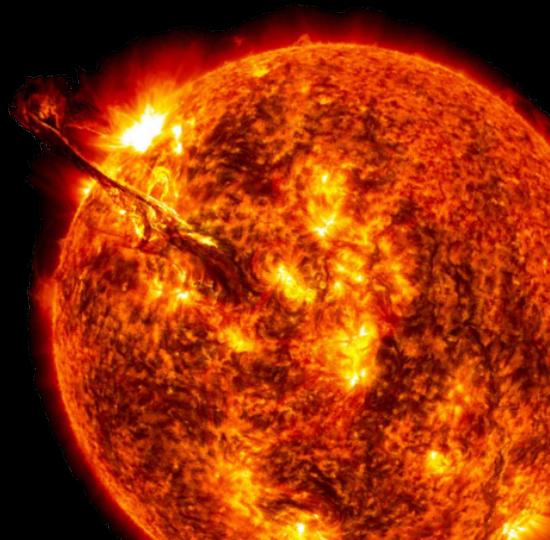


Performance of solar far-side active regions neural detection

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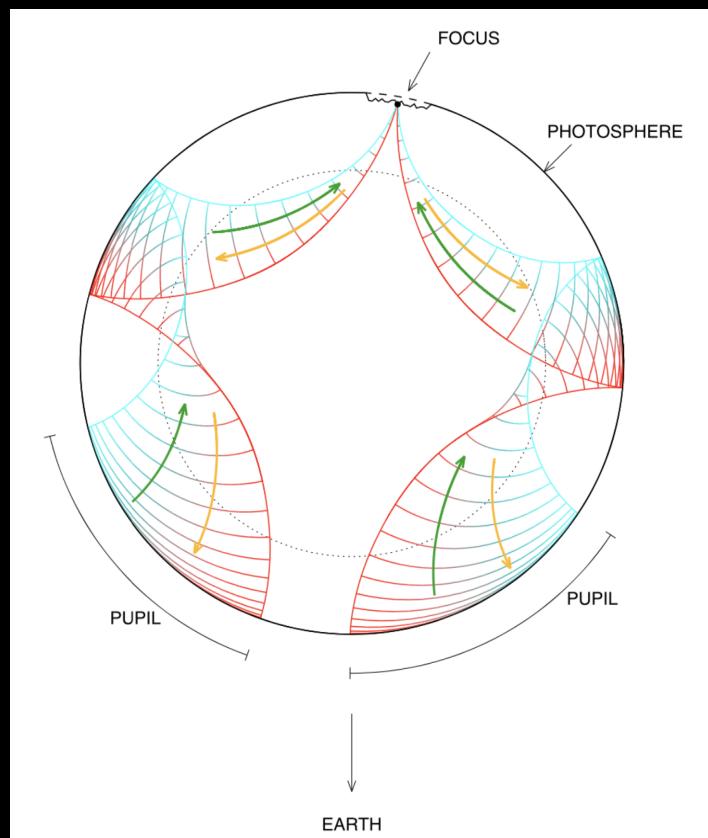
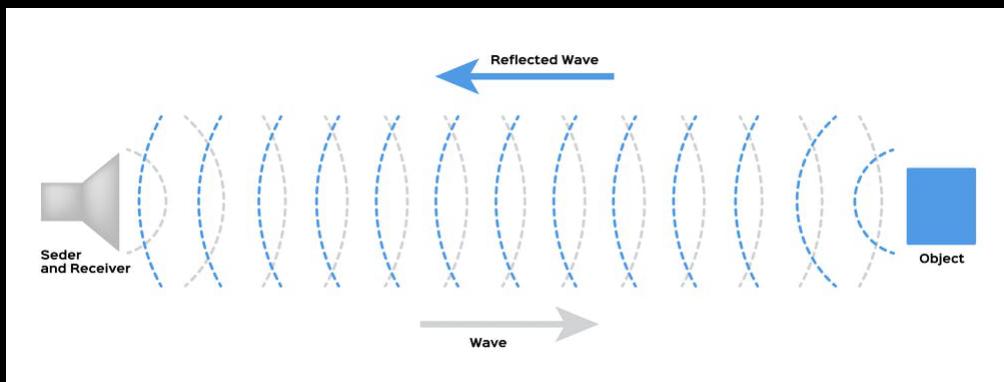
² Universidad de La Laguna



Usual farside activity detection and limitations

Farside holography

- Wilson Depression in sunspots
- Less travel time for waves
- Echo of farside activity on the nearside

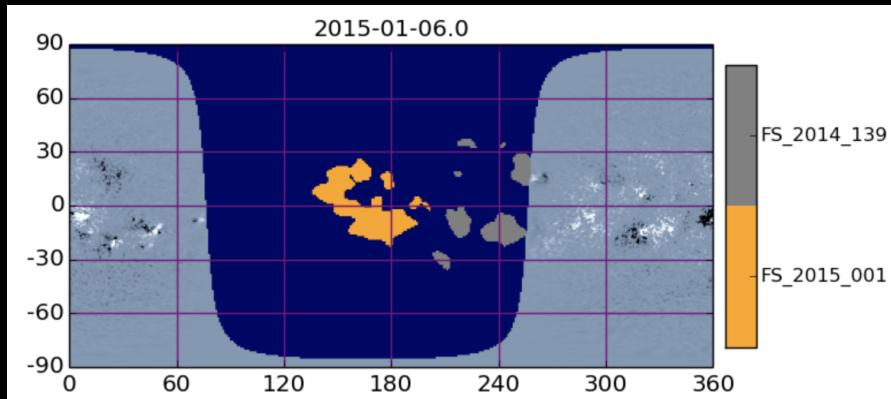


Lindsey, C. & Braun, D. C. 2000b, Science, 287, 1799

Usual farside activity detection and limitations

Predictions

- Seismic Strength (S): $S = \int_A \Delta\phi$
- SAR if $S > 400$

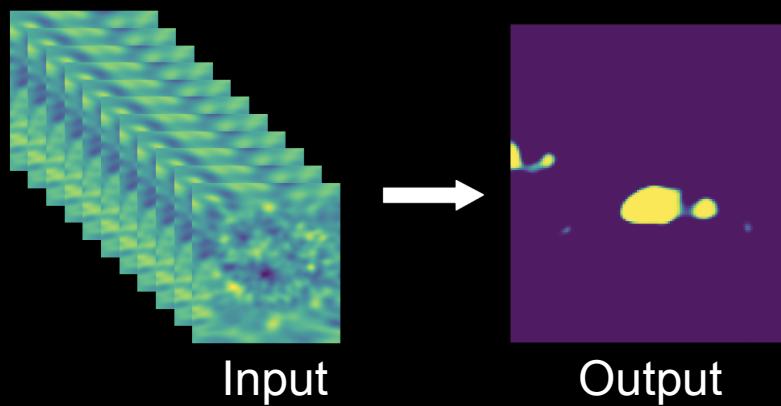
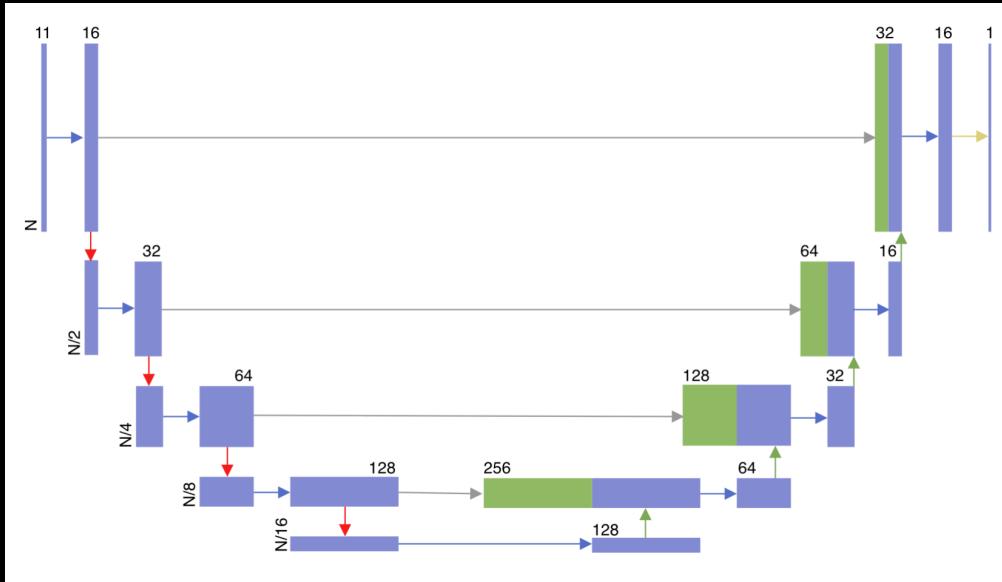


Strong active regions prediction from SSMS. 6 January 2015.

Source: <http://jsoc.stanford.edu/data/farside/>

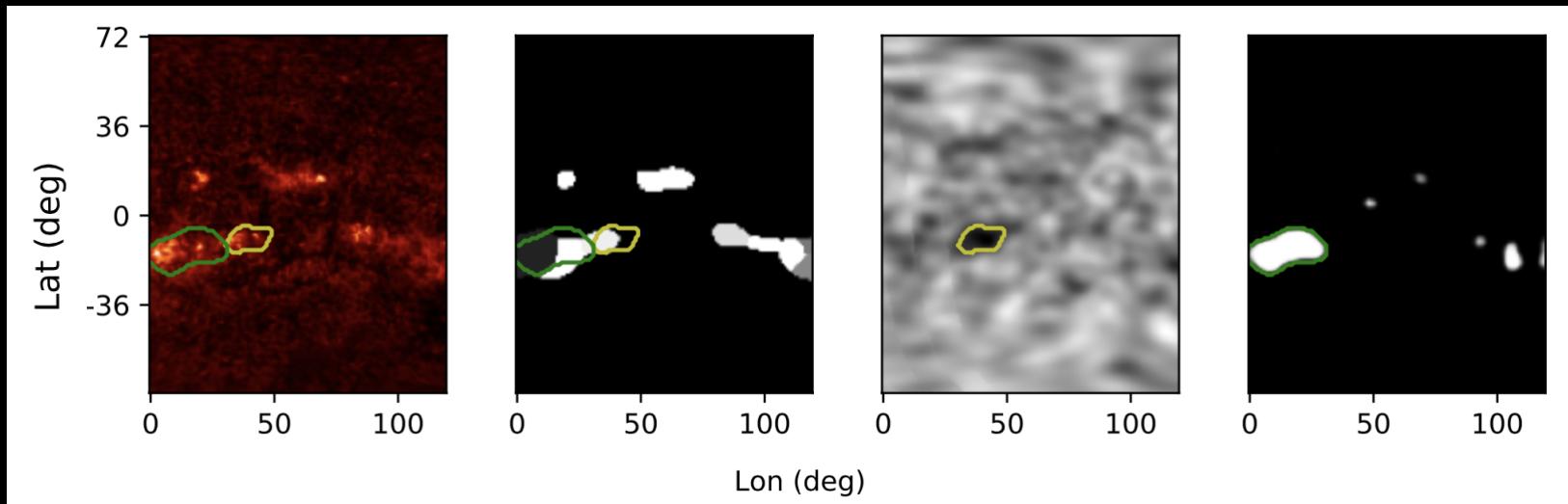
Issue: only strong AR with great acoustic signatures can be reliably detected

Neural network

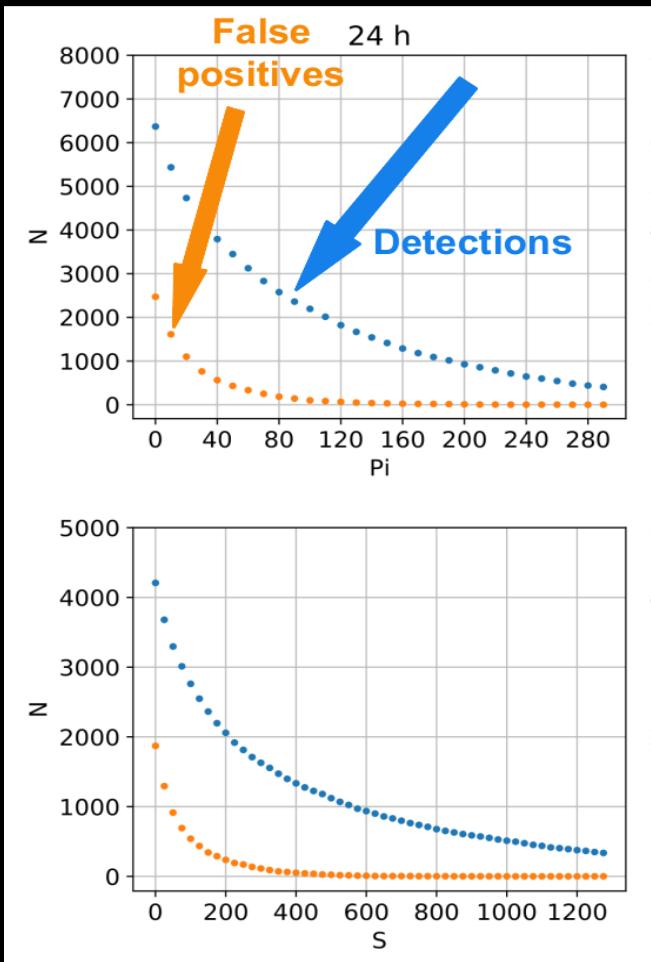


Study method

- Comparison of results of both methods using data from **April 2011 to May 2016**.
- Activity proxy: activity **masks** extracted from far-side **STEREO** satellites images.



Results



	Detections	False Positives
$S > 400$	1334	52 (3.75%)
$P_i > 113$	1958	76 (3.74%)

47%
IMPROVEMENT

E. G. Broock, T. Felipe, A. Asensio Ramos,
2021 <https://arxiv.org/abs/2106.09365>
(accepted by A&A)

What's next?

Aims: improving the network capacities.

Current projects:

- **STEREO masks:** training the network with the same P-S maps as inputs and the EUV masks used in this study as expected values. 180° longitude.
- Tests with **attention blocks** and **LSTM** modules.
- **Multi-channel magnetograms:** training the network with the same P-S maps as inputs and magnetogram masks with a value per magnetic field range.
Extracting full magnetograms from P-S maps.

Future projects:

- **Dopplergrams as training inputs:** using dopplergrams as inputs for the network to infer rawer correlations.

References

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THANK YOU FOR YOUR ATTENTION

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