

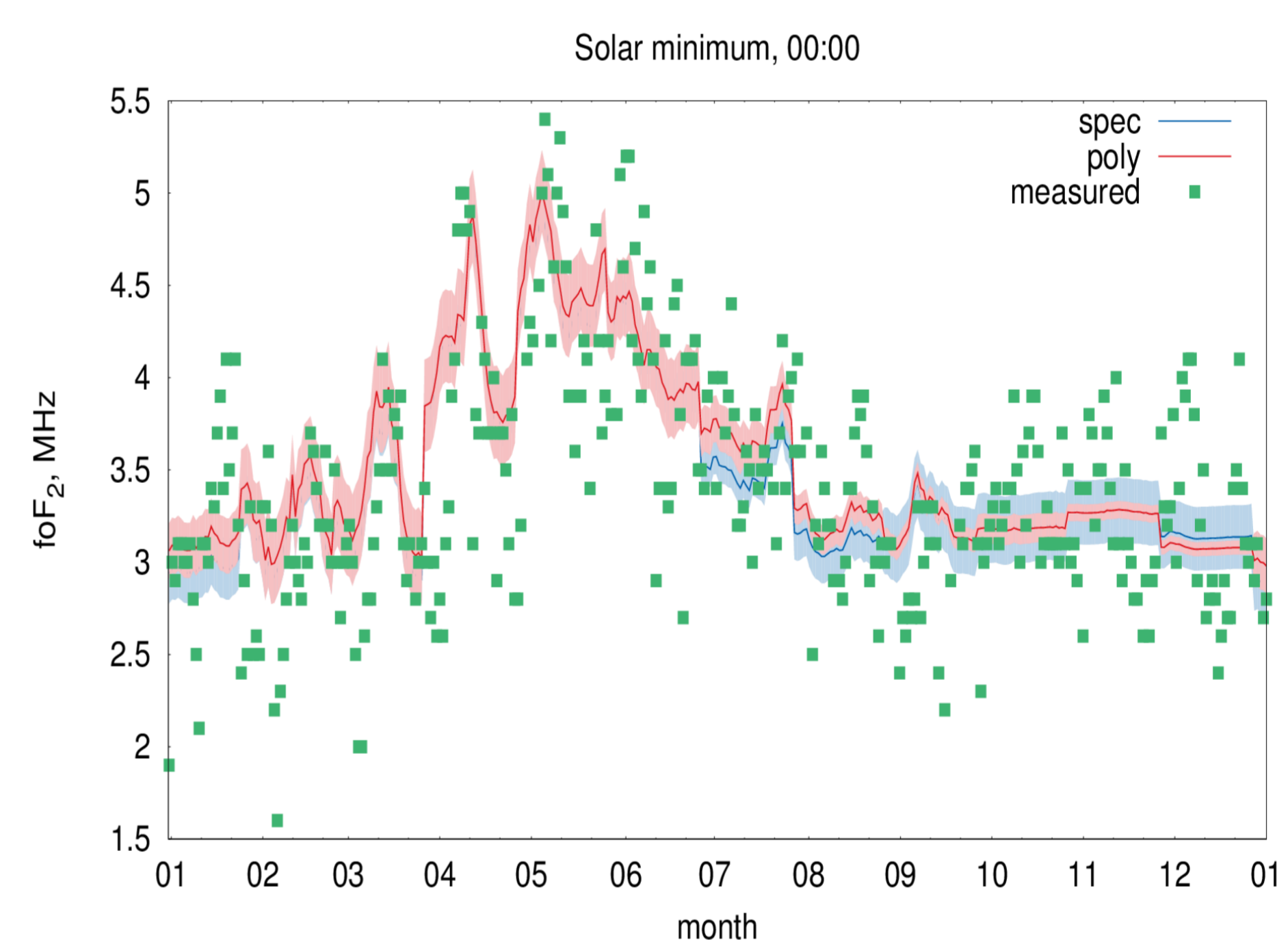
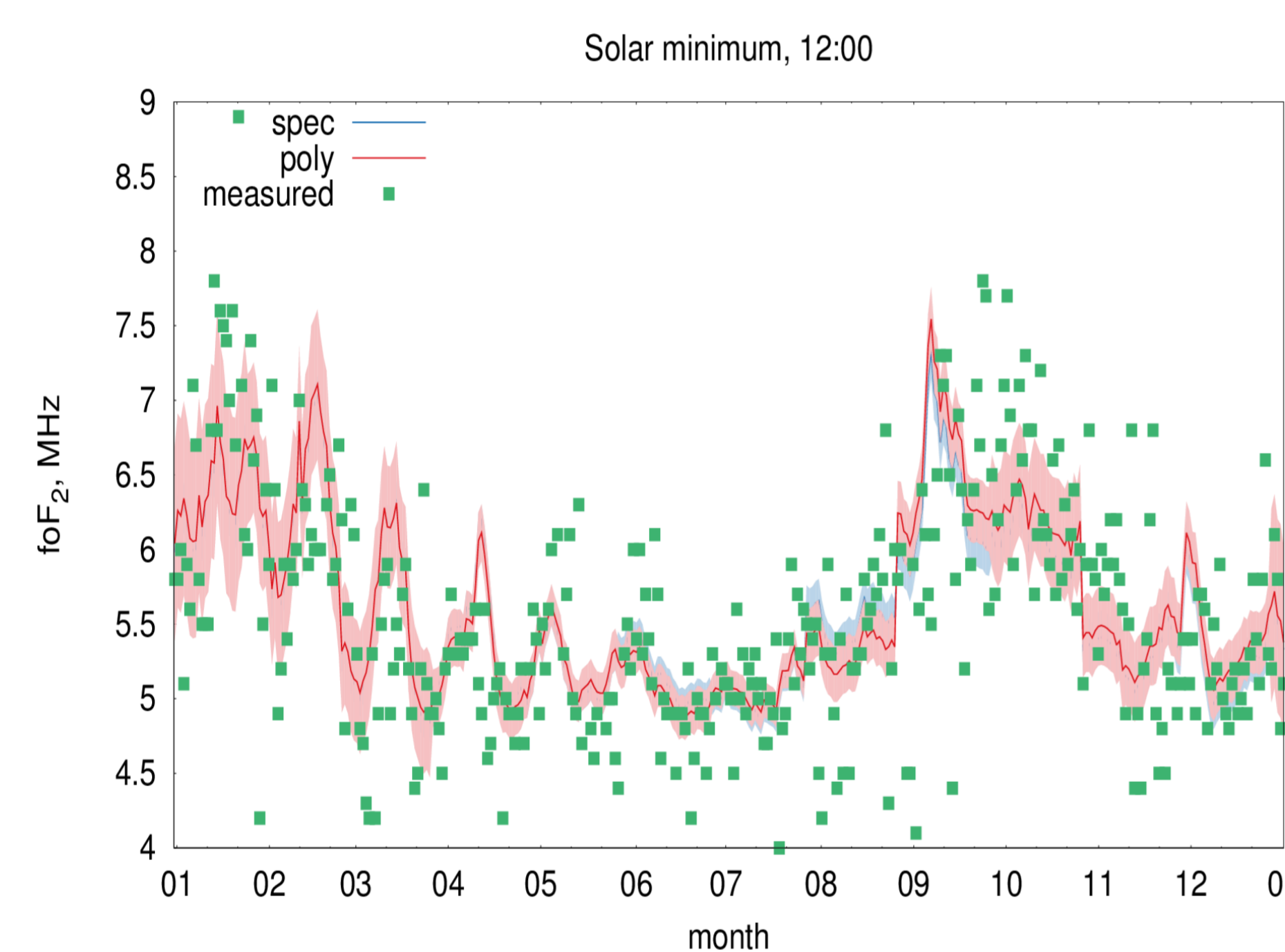
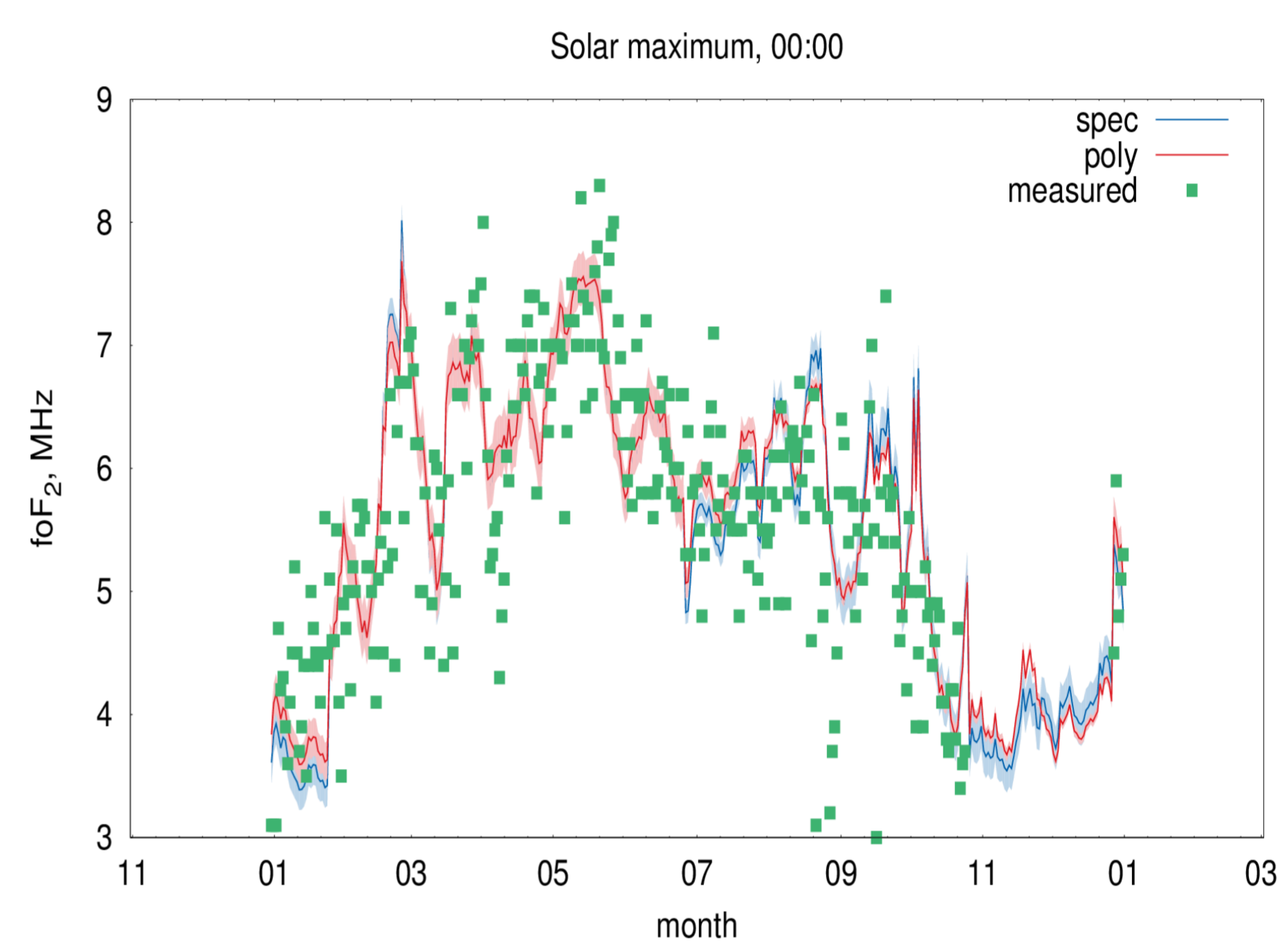
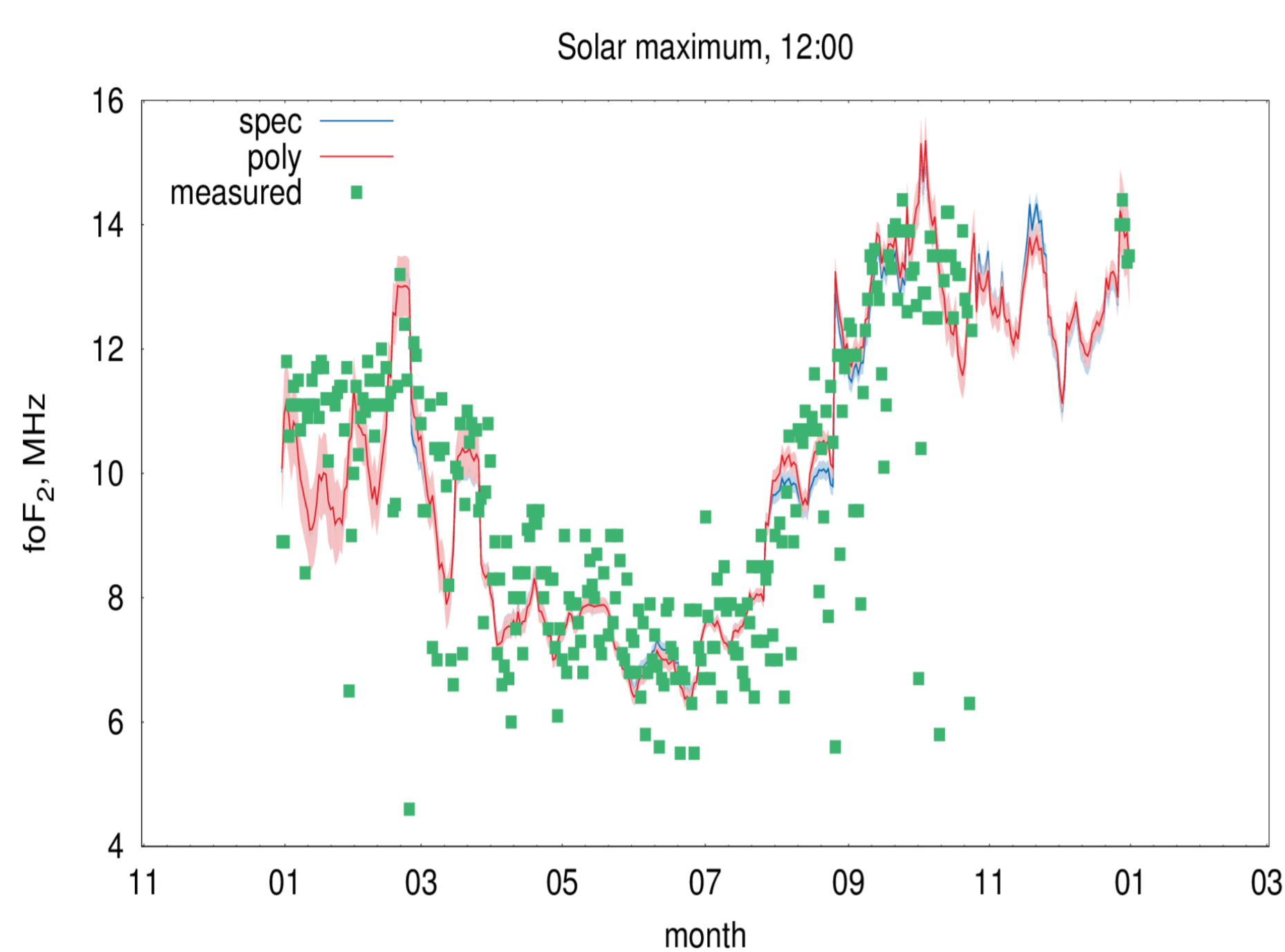
Abstract

The upper most layer of the ionosphere is the F₂ layer which is responsible for long distance HF radio communication. An hourly monthly median model for the F-layer critical frequency foF2 permits an easy evaluation of this ionospheric parameter. The model allows to obtain an hourly value for the foF2 by using a predicted value of the solar flux F_{10.7}.

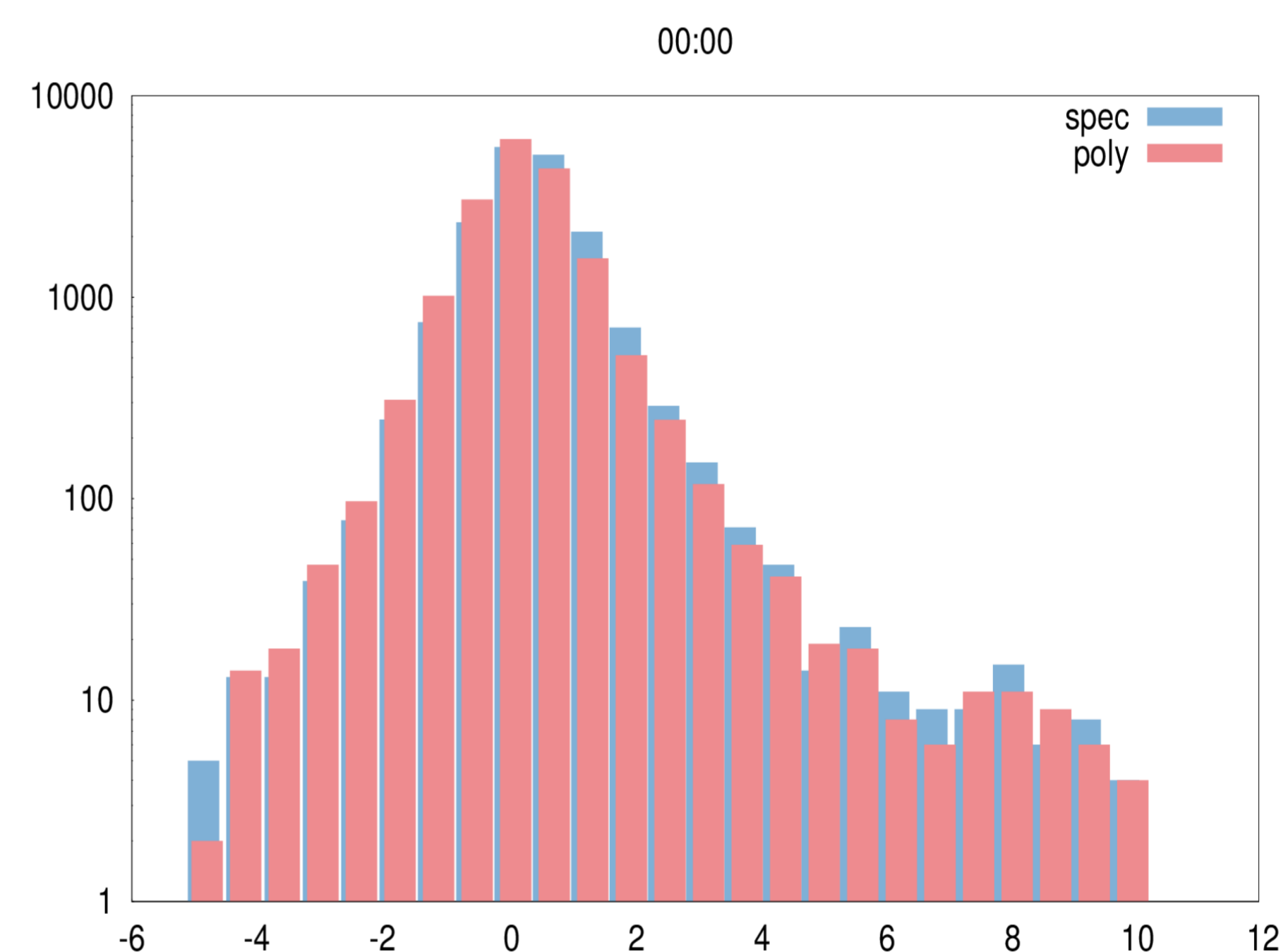
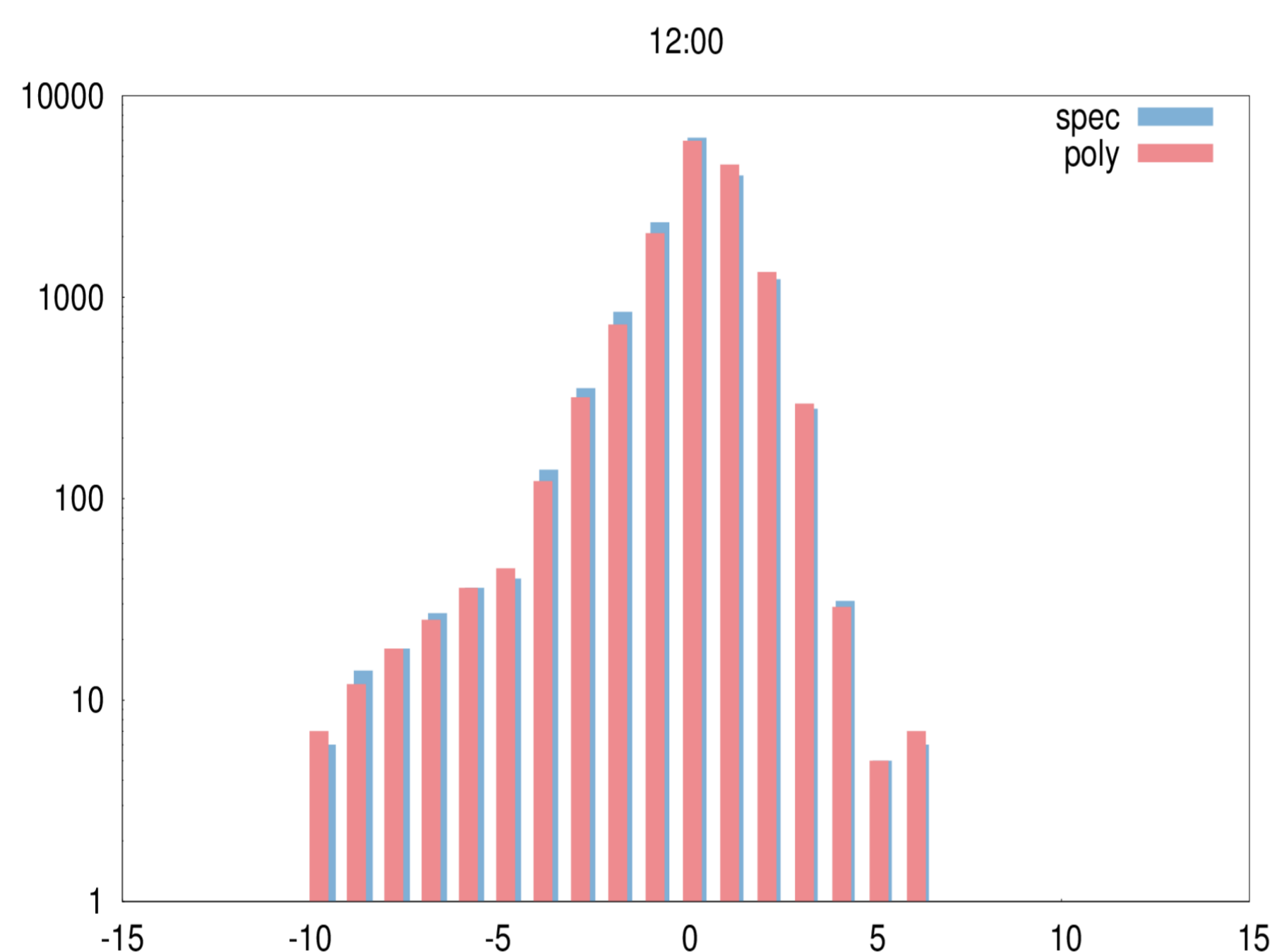
Method:

1. Polynomial (statistical) model – fitting the hourly monthly median values of the foF2 to the monthly median value of F_{10.7} [1].
2. Spectral model – decomposition of the hourly monthly median values using one or more Fourier transformation(s). The time dependent values (hour, month) are then expressed by a sum of harmonics [2]. The dependence on F_{10.7} is still described by a polynomial.

Results. Application of the model for the calculation of the hourly value of the foF2:



Model evaluation. Distributions of the deviations from the measured values at noon and at midnight:



Conclusions:

The model is not continuously depending on the value of the F_{10.7}, there may appear discontinuous jumps in the modelled values on passing from one month to another. The modeled values are centered at the median of the measured F-layer critical frequency. However, during solar minimum, when there are less fluctuations in the F layer critical frequency, the two models produce better values. At solar maximum the models are less accurate.

References:

1. D. V. Pancheva and P. Y. Mukhtarov, Annals of Geophysics, vol. 39, nr. 4, pp. 807-818, 1996.
2. L. Liu, W. Wan, and B. Ning, Radio Science, vol. 39, nr. 2, 2004.