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Comment

## ***Interactive comment on “Using sparse regularization for multiresolution tomography of the ionosphere” by T. Paniciari et al.***

### **Anonymous Referee #2**

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Tomographic reconstruction is an important tool to understand the ionosphere, which allows reconstructing the state of the ionosphere in terms of electron content from a set of Slant Total Electron Content (STEC) measurements. It is an inverse problem, and in this case it is underdetermined and calibration may be also involved. The geometry and the uneven distribution of the observations make the inversion hard. In this paper, the authors introduced an alternative method based on  $l_1$  norm, related to  $l_2$  norm, which is expected to deal better with the uneven distribution of the observations. The work is correctly done and the paper is well written. Here we only raise some optional comments for reference: (1) Page 8, line 11, the function  $P(n)$  is critical for the inversion, as it is the solution for the ill conditioned function and make the solution unique. In Sec 2.4, the authors made a comparison between the  $l_1$  and  $l_2$  norm, however, which is the choice of this work? What is new in this paper? Did the authors make any comparisons

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between different  $P(n)$ ? Please clarify. (2) Page 7, Line 13, what are  $N1$  and  $N2$  please clarify, there is also a typo in Line 14 for  $n1$  and  $n2$ . (3) Page 35 and 36, there are significant differences between the Model-aided reconstruction fig10 and norm based reconstruction. Does that mean both are correct, what is advantage and disadvantage of two method? Please add more discussions in Sec.3.1? (4) The authors should add some information about how the simulations is done, especially how Eq. (18) and (20) is numerically solved.

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Interactive comment on Nonlin. Processes Geophys. Discuss., 2, 537, 2015.

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