

Interactive comment on “Quasi-synchronous ionospheric and surface latent heat flux anomalies before the 2007 Pu’er earthquake in China” by K. Qin et al.

Anonymous Referee #2

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General comments

Qin et al. claim the observation of ionospheric (Ne enhancements) and thermal anomalies before the 2007 Pu’er earthquake. The authors suggest a possible relationship between the presumed anomalies and the subsequent seismic event. Namely, the observed anomalies would be precursors of the Pu’er earthquake. Many published studies have claimed the observation of ionospheric and electromagnetic precursors of earthquakes. Recently, review papers have put into question many observations of earthquake precursors demonstrating that previous studies did not show strong evidence of correlation between the presumed precursors and seismic events. There-

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fore, at present this field of research needs of real and validated precursory signals of earthquakes.

In my opinion the observations reported by Qin et al. are not real precursors of the Pu’er earthquake.

Specific Comments

1) Care must be taken when it is stated “Pre-earthquake ionospheric and thermal anomalies are two widely-reported short-term earthquake precursors”. This sentence does not reflect the current progress of the research on precursors of earthquakes. In the last two decades, a large number of papers have claimed the observation of pre-earthquake ionospheric anomalies. However, I am not aware of studies in which the authors have shown real and validated earthquake precursors. The most used word in these reports is “possible”, but nothing is proven. Just because an event occurs before another does not mean that they are related if it is not demonstrated a strong evidence of the suggested relation.

2) Comment to Figure 1.

In my opinion, the electron density values of the orbit 15440-1 highlighted by the dotted box are not really anomalous. The two orbits 15440-1 and 15675-1 show comparable values of electron density in the latitude range 20°–30°N.

3) Comment to Figure 2.

The presumed precursor that occurred on 24 May 2007 is similar to the Ne increase of the end of May 2006. However this increase is not correlated with an earthquake. Since in 2006 and in 2007 the Ne maximum occurs in the same period (May) we may suppose that there is an annual periodicity in the electron density values.

In summary, in Figs. 1 and 2 there is no evidence that the Ne increases that Qin et al. claim to be anomalous are precursor of the Pu’er earthquake. On the contrary, the Ne values fall within its normal variation.

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4)Comment to Figure 3.

The time period shown in the figure is too short (about a month before the earthquake) to reach a reasonable conclusion. I agree with you, the spatial distribution of SLHF values is related to many factors. Therefore, how can we claim that there is a relationship between the SLHF peak of 23 May 2007 and the Pu'er earthquake?

5)Comment to Figure 4.

What is the origin of the wide SLHF increase that appears in the bottom left corner of Fig 4c?

6)As the authors emphasize, the mechanisms proposed to explain the generation of possible earthquake ionospheric precursors cannot be considered completely satisfactory. For example, Johnston and Dahlgren in their presentation at EMSEV 2012 (<http://www.emsev-iugg.org/2012program/subpages/abstract/4-05.pdf>) have seriously questioned the extrapolation of the Freund's P-hole model as generation mechanism of possible seismogenic electromagnetic signals. I think that the authors should discuss in more detail the generation mechanisms of earthquake precursors.

7)The authors claim the occurrence of one Ne anomaly on 24 May, 2007 and three SLHF anomalies on 22, 23, and 26 May, 2007. According to them the two kinds of anomalies are generated by the same mechanism, i.e., the air ionization (see Fig. 5 of the manuscript). Why Ne and SLHF anomalies did not occurred simultaneously if they were generated by the same mechanism?

Technical corrections

1)English should be revised.

2)Page 2440 lines 7-10. The sentence "As contrasted.local active faults." is unclear.

3)Page 2441 line 6. Change "nice" with "good".

4)Page 2442 line 8. Delete "(referring.epicentre)".

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5)Page 2442 lines 10-24. This part is confusing.

6)Page 2443 lines 3-4. Delete "plotted using Matlab software"

7)Page 2444 line 21. Delete "using Generic Mapping Tools software"

In conclusion, contrary to the opinion of A. De Santis, I do not think that the manuscript by Qin et al. moves a little step forward the research on earthquake precursors. In my opinion, their study does not provide evidence of the occurrence of real precursors before the Pu'er earthquake. Therefore, I do not recommend the publication on NHES.

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