

Interactive comment on “Anomalies of zenith tropospheric delay following the M_w 7.8 Haida Gwaii earthquake” by Y. B. Yao et al.

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Dear Sir,

Thank you very much for your comments.

The relationship between the huge earthquake and the variation of Zenith Troposphere Delay is still uncertain now, other researchers did related study on this topic, for example Jin et al (2011). Our study mainly bases on Jin's work in 2011, expecting to explore more atmospheric effect related to big earthquakes. We did several explanations as follows:

1) In this research, we mainly discussed the anomalies of the troposphere following

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the 2012 Haida Gwaii Earthquake through the expression of the Zenith Tropospheric Delay, then we analyzed the probability that such anomalies were seismic from multiple perspectives.

2) With the method of Jin et al. 2011, we can see some abnormal decrease in the ZTD time series based on the data from 2000 to 2013, ZTD decreased by approximately dozens of millimeters at some of these sites and even reached 100mm for a prolonged period in Fig. 2. The details are shown in section 3.1 in the manuscript.

3) The new detection method used in the manuscript is originated from the difference method in cycle slip detection, it is able to detect the small anomalies in regular number sequence, while ZTD sequence has regularity to a great extent, so it is effective in detection of ZTD anomalies. Sharply drop were detected through the new method, the drop can be seen from Fig. 4. More details are described in section 3.2 in the manuscript.

4) We used the forecast data of ECMWF to remove the trend of the ZTD because it can reflect the background value of ZTD and ECMWF is the best forecast data available, this idea also come from advice of Dr. Johannes Bohm. After remove the ZTD trend, we find ZTD dropped clearly in the first four figures, and the detailed discuss is in section 3.4 in the manuscript. Also, we will try to get the background with data of higher quality.

5) We find the anomalies in troposphere after the Earthquake from both the ZTD time series and our new detection method. Besides, we excluded the meteorological factors that can disturb troposphere, thus we think they are highly possible to be related with the earthquake.

In summary, we find some anomalous drop of ZTD after the Earthquake from the ZTD time series, new ZTD anomaly detection method, and ZTD disturbances after filtering of background trend. Though we cannot confirm the anomalies were caused by the M_w 7.8 Haida Gwaii Earthquake all to nothing, we think the result in the manuscript is help-

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ful for understanding the atmospheric responding of earthquake and further discussion would be meaningful for earthquake hazard.

Best regards, Yibin Yao

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