



## ***Interactive comment on “A wireless sensor network for monitoring volcanic tremors” by R. Lopes Pereira et al.***

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1 - The main aim is to create a system able to locate magma movements causing seismic tremor. This task is challenging because the tremor signals might be very small. This means that the recording system must be very sensitive. I found missing in the manuscript a detailed discussion concerning the instrumental noise of the ADC&sensor combination selected for the system and its performance on the field recording seismic tremor. The internal noise of the ADC in fact might considerably decrease the available effective dynamic range available for the recording of the seismic tremors. In particular, I suggest the Authors to show the comparison of their new system with a standard seismic station (broadband + 24 bit commercial ADC).

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A table detailing various properties of the ADC and the data acquisition board was added at the beginning of the Implementation section.

2 - At the end of paragraph 1, the section 4 is not introduced.

Included Section 4 on the document structure outline.

3 - Despite in general I regret to suggest papers where I am co-author, I think that the Authors might have advantage and inspiration of some of the tests and solutions adopted for the developing of the SOSEWIN System, a wireless seismic system for earthquake early warning purpose. Hence, I suggest: a) J. Fischer, J. P. Redlich, J. Zschau, C. Milkereit, M. Picozzi, K. Fleming, M. Brumbulli, B. Lichtblau, I. Eveslage. A wireless mesh sensing network for early warning. *Journal of Network and Computer Applications*, Volume 35, Issue 2, March 2012, Pages 538–547. b) Picozzi, M.; Milkereit, C.; Parolai, S.; Jaeckel, K.-H.; Veit, I.; Fischer, J.; Zschau, J. GFZ Wireless Seismic Array (GFZ-WISE), a Wireless Mesh Network of Seismic Sensors: New Perspectives for Seismic Noise Array Investigations and Site Monitoring. *Sensors* 2010, 10, 3280-3304. doi:10.3390/s100403280. c) Fleming, K., Picozzi, M., Milkereit, C., Kuehnlentz, F., Lichtblau, B., Fischer, J., Zulfikar, C., Ozel, O., and the SAFER and EDIM working groups (2009). The Self-Organising Seismic Early Warning Information System (SOSEWIN). *Seismological Research Letters*, Vol. 80, N 5 September/October 2009, pp 755-771, doi: 10.1785/gssrl.80.5.755.

The related work section was updated to include these studies.

4 - Section 3.3.5 puzzled me. While I understand that it is very important to know the time lost for the data telemetry within the network, from the description of the CLOWDE algorithm it seems that it is focused on defining the time to be assigned to the data in the sink node. Way to do this very critical operation at the sink node and not directly in the ADC at each station at the moment the data are created?

The CLOWDE algorithm allows for nodes to operate without the use of a GPS, except

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in the sink node. In these type of scenarios, the ADC in nodes that are not the sink node do not have any method to discover the current global time.

5 - On this issue, I suggest the Authors to look the SeedLink protocol, which is becoming a worldwide standard in the seismological community and seismological instrument manufactures.

The seedlink protocols is used to transmit seismological samples between nodes. It does not provide a time synchronization mechanism required for some nodes to dispense the use of GPS devices. CLOWDE does not replace seedlink, they have different objectives. As the SeedLink protocol also provides a standard format to store information we have indicated in the revised document an URL where a converser can be downloaded.

6 - As I said, I found section 5 not adequate. Tests concerning the performance on the field of the system should be shown. In conclusion, I suggest major revision.

The final section has been increased, detailing a field test as the reviewer requested. This test field includes a validation of the WSN's behaviour in the presence of node failure as well as demonstration of the nodes ability to operate continuously.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 4305, 2013.

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