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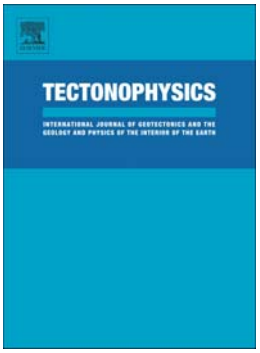

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Francis T. Wu, Zachary E. Ross, David Okaya, Yehuda Ben-Zion, Chien-Ying Wang, Hao Kuo-Chen, Wen-Tzong Liang

PII: S0040-1951(16)30078-6
DOI: doi: 10.1016/j.tecto.2016.04.025
Reference: TECTO 127061

To appear in: *Tectonophysics*

Received date: 6 April 2015
Revised date: 19 March 2016
Accepted date: 13 April 2016

Please cite this article as: Wu, Francis T., Ross, Zachary E., Okaya, David, Ben-Zion, Yehuda, Wang, Chien-Ying, Kuo-Chen, Hao, Liang, Wen-Tzong, Dense network, intense seismicity and tectonics of Taiwan, *Tectonophysics* (2016), doi: 10.1016/j.tecto.2016.04.025

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Dense Network, Intense Seismicity and Tectonics of Taiwan

Francis T. Wu[1,2], Zachary E. Ross[2], David Okaya[2], Yehuda Ben-Zion[2], Chien-Ying Wang[3]. Hao Kuo-Chen[3] and Wen-Tzong Liang[4]

[1]State University of New York at Binghamton, New York 13902
[2]University of Southern California, Los Angeles, California 90007
[3]National Central University, Chungli, Taiwan
[4]Institute of Earth Sciences, Academia Sinica, Nankang, Taiwan

Corresponding Author: Francis T Wu; wu@binghamton.edu

0. Highlights

- A temporary network of linear arrays was set up in Taiwan for 2 ½ months to monitor offshore airgun shots
- The continuously recording stations acquired a large amount of earthquake data
- Using automatic detection and picking and hypoDD more than 4800 events are taken as well-located
- Main seismicity patterns under the island are identified in the results.
- In addition, trends under the western Coastal Plain and the Central Range are recognized.

1. Abstract

A temporary seismic network consisting of 295 land stations was deployed in 2009 in Taiwan to monitor airgun sources during an onshore-offshore experiment in Taiwan. We exploit the continuously recorded dataset to detect and map seismicity in the seismically very active Taiwan. By combining recent automatic detection and phase picking techniques, we successfully generate an initial earthquake catalog of over 8400 events. The HypoDD algorithm is used to relocate and filter these events. This network recorded smaller events than the permanent regional network because of the many stations around the high mountain ranges and the generally high station density along 6 lines. The results based on the 2009 data generally reproduce the dominant seismicity features from many years of earthquake monitoring in Taiwan. In addition, we map hitherto unknown dipping zones under the Foothills and the Central Range that may correspond to seismogenic structures.

2. Introduction

Taiwan is a very young and active mountain building area where the Central Range (Figs. 1 and 2) is rapidly exhuming (Lee et al., 2004). High seismicity accompanies the geological processes and provides clues to the strain changes, material properties and the causative plate tectonic environment. Dense station coverage and abundant seismicity are both desirable for delineating active zones and their overall relations to the tectonic processes of a region. During the recent TAIGER project (Wu et al., 2014) stations monitoring airgun shots from R/V Langseth around Taiwan were deployed. In the more traditional "onshore-offshore" deployment, whose primary purpose was to record shipboard airguns, recording windows were set up. The 3-component instruments employed had sufficient data storage for continuous recording during the two and half months of the ship operation. The network included 295

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