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Letter to the Editor

The Australian Tsunami Warning System and lessons from the 2 April 2007 Solomon Islands tsunami alert in Australia

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Dear Sir,

“The Australian Tsunami Warning System and lessons from the 2 April 2007 Solomon Islands tsunami alert in Australia”

At 06:40 Australian Eastern Standard Time (AEST) on Monday 2 April 2007, a magnitude 8.1 earthquake 10 km beneath the sea in the Solomon Islands generated a tsunami (Geoscience Australia, 2007). Locally, this tsunami was large and caused a notable loss of life, extensive destruction to homes, infrastructure and agricultural systems. For those communities within the Solomon Islands affected, this event was every bit a natural disaster. This event was also significant to Australia because for the first time the Australian Tsunami Warning System (ATWS) swung in to action. The ATWS was established following the catastrophic Indian Ocean tsunami of 26 December 2004 and is costing approximately AUS\$70 million. The system is due to be fully operational by mid 2009.

The ATWS consists of two components. First is the physical hardware – the actual detection and monitoring equipment. The hardware falls under the responsibility of Geoscience Australia (GA) which is required to detect, locate and evaluate potential tsunami generating earthquakes and the Bureau of Meteorology (BoM) which is responsible for monitoring deep water tsunami detection buoys and tide gauges at various points in the SW Pacific and Indian Oceans. Together, these agencies evaluate incoming data and where appropriate calculate and/or provide arrival times of tsunami for locations along Australia’s coast. Second is the information and warning and emergency management component. Where necessary, the BoM is required to issue alert and warning messages to Emergency Management Aus-

tralia (EMA), the State Emergency Services (SES) and media agencies.

When a tsunami has been detected (as on the 2 April), if sufficient time allows, the BoM runs simulations to determine the probable wave height along Australia’s coasts. When time is not available, the BoM selects pre-computed simulations for an event “similar” in magnitude to that which has been generated. This information is used by the SES’s to determine whether evacuation orders should be issued to local authorities and communities. On the 2 April 2007, Geoscience Australia successfully determined the location, size and characteristics of the earthquake and the BoM the probability and magnitude of a tsunami. At 07:20 AEST, the Bureau of Meteorology issued its first National Tsunami Bulletin (or advisory message). At this point, the New South Wales State Tsunami Disaster Management Plan was activated.

At 08:30 AEST, the New South Wales State Emergency Service opened its State Emergency Operations Centre and began following its protocol for contacting key organizations such as life surf saving clubs and port authorities along the State’s coastline either directly from State Headquarters or via its Regional and Local Area Controllers. At this point, beaches began to be evacuated, boats were ordered to move to deeper water and some low lying coastal schools were evacuated. Simultaneously, news of a potentially “dangerous” tsunami spread across all media networks and live streaming of the warning began.

Fortunately for Australia, only a small tsunami affected the eastern seaboard, and no losses occurred. In the week that followed this event, the media and members of the public rightly asked probing questions about the effectiveness of the ATWS and whether it had performed adequately or, as many in the media reported, had failed.

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Such questions should be asked and federal and state authorities are currently engaged in a process of reflection, analysis and learning. However, it is worth noting the following:

1. the physical infrastructure of the ATWS worked very well. Geoscience Australia were able to quickly locate the earthquake and determine its character;
2. the Bureau of Meteorology were able to determine appropriate simulations of the tsunami and issued a National Tsunami Bulletin within 40 min of the event; and
3. transmission of the alert message to Emergency Management Australia, the State Emergency Service's and media occurred effectively.

However, whilst evacuation orders were issued at specific points along the NSW coastline, the public and the media were confused about the nature, meaning and intent of the alerts and warnings and for most, it was not clear what was happening. This has taught us two important lessons. First, the physical warning system is not enough in itself to result in a *reduction of vulnerability* to tsunami. Just because we have a warning system does not mean the job is done. Second, much work needs to be undertaken to ensure that communities have been educated about tsunami hazard and risk and what alert and warning messages mean, how to react, where to evacuate and how quickly to respond. Furthermore, the emergency services and the Emergency Management Australia must work urgently to effect community tsunami disaster management planning, identification of safe evacuation zones, testing and evaluation of tsunami warning messages and trialing of these plans with the public. Such obvious recommendations have been made elsewhere (see Bird and Dominey-Howes, 2006, 2007; Lowe et al., 2007) but the events of 2 April 2007 demonstrate very clearly the need for such actions.

Since December 2004, the Australian federal government – its agencies and the Australian state emergency services have made tremendous efforts towards the development and deployment of an operational Australian Tsunami Warning System and these efforts are to be congratulated. However, much more work needs to be completed to ensure that the emergency management elements of warning and evacuation are properly developed, communicated to the public and tested. Without the latter, Australia's coastal people remain vulnerable to tsunami and the \$70 million of investment may not be realised.

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