SUMMARY OF EARTHQUAKES
Occuring May-June 2006

With surface wave or moment magnitude (Mw) greater than or equal to 6.5 and a depth no greater than 100 km, or an event for which a Tsunami Information Bulletin (TIB) or Regional Watch Warning (RWW) was issued. Epicenter, and Mw from USGS National Earthquake Information Center (NEIC, G); Mw, and centroid depth from Harvard (H); Mw from PTWC (P) at action time.

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME (UTC)</th>
<th>LOCATION</th>
<th>EPICENTER</th>
<th>DEPTH (km)</th>
<th>Mw</th>
<th>PTWC ACTION</th>
<th>ACTION TIME</th>
<th>TSUNAMI?</th>
<th>DAMAGING?</th>
<th>Maximum  height and place</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 May</td>
<td>15:27</td>
<td>Tonga</td>
<td>20.130° S 174.164° W</td>
<td>55</td>
<td>8.1(P1) 7.9 (G) 7.8 (P2,P3)</td>
<td>001 RWW 002 RWW 003 Cancel</td>
<td>15:42</td>
<td>16:33</td>
<td>17:39</td>
<td>Yes</td>
</tr>
<tr>
<td>10 May</td>
<td>02:43</td>
<td>Fox Islands, Aleutian Islands, Alaska</td>
<td>52.515 N 169.257 W</td>
<td>18</td>
<td>6.5 (P) 6.4 (H) 6.3 (G)</td>
<td>TIB 02:52</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 May</td>
<td>10:39</td>
<td>Kermadec Islands</td>
<td>31.782° S 179.307° W</td>
<td>152</td>
<td>7.5 (P) 7.4 (G,H)</td>
<td>TIB 10:59</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 May</td>
<td>15:28</td>
<td>Nias Region, Indonesia</td>
<td>0.103° N 97.049° E</td>
<td>16</td>
<td>6.9 (P) 6.8 (G,H)</td>
<td>TIB 15:42</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 May</td>
<td>11:12</td>
<td>Near East Coast of Koryakia, Russia</td>
<td>60.776 N 165.712 E</td>
<td>17</td>
<td>6.7 (P) 6.6 (H) 6.5 (G)</td>
<td>TIB 11:22</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 May</td>
<td>03:12</td>
<td>New Britain Region, Papua New Guinea</td>
<td>5.727 S 151.139 E</td>
<td>34</td>
<td>6.7 (P) 6.5 (G, H)</td>
<td>TIB 03:26</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TONGA 3 MAY 2006, 15:37 UTC, Mw=7.9

A major earthquake occurred in Tonga, about 160 km NE of Nuku’Alofa and equally far south of Neiafu. The earthquake, which happened at 4:26 AM (4 May) local time, measured 7.9 (Mw, USGS) and was felt throughout the surrounding islands. Although some damage was reported, few injuries and no deaths resulted. Steps were taken to escape a possible tsunami in Fiji and Gisborne, New Zealand.

A summary provided by the USGS National Earthquake Information Center (NEIC) lists recorded wave heights in meters (peak-to-trough) at the following selected tide stations: 0.54 m at Pago Pago, American Samoa; 0.10m at Tofino, British Columbia, Canada; 0.13 m at Ratatonga, Cook Islands; 0.07 m at Suva, Fiji; 0.15 at Hanasaki, Japan; 0.48 m at Noumea, New Caledonia; 0.15 m at Jackson Bay, New Zealand; 0.42 m on Niue; 0.42 m at Apia, Samoa; 0.42 m at Nuku’alofa, Tonga; 0.13 m at King Cove, Alaska, 0.54 m at Crescent City, California, 0.35 m at Santa Barbara, California, 0.10 m at San Francisco, California, 0.49 m at Kahului, Hawaii, Historical seismicity with Harvard Centroid Moment Tensor Solution (CMT). The recent earthquake location is marked by a star. Map courtesy of USGS National Earthquake Information Center (NEIC).
Tonga, continued
0.12 m at Portland, Oregon, 0.11 m at La Push, Washington, U.S.A; and 0.45 m at Port Vila, Vanuatu.

Water Level records from Canada
The Tonga tsunami of May 3, 2006 was clearly recorded near the coast of British Columbia as seen by the plot of the records to the right. These record the water level after high-pass filtering with 3-hour Kaiser-Bessel window and the red line indicates the time the earthquake occurred.

<table>
<thead>
<tr>
<th>Stations (in British Columbia)</th>
<th>Arrival time UTC</th>
<th>Travel time</th>
<th>Max wave height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bella Bella</td>
<td>04:16</td>
<td>12h 49m</td>
<td>5.7 cm</td>
</tr>
<tr>
<td>Port Hardy</td>
<td>04:15</td>
<td>12h 48m</td>
<td>3.7 cm</td>
</tr>
<tr>
<td>Winter Harbour</td>
<td>03:31</td>
<td>12h 04m</td>
<td>10.8 cm</td>
</tr>
<tr>
<td>Tofino</td>
<td>03:49</td>
<td>12h 22m</td>
<td>6.9 cm</td>
</tr>
<tr>
<td>Bamfield</td>
<td>04:00</td>
<td>12h 33m</td>
<td>5.6 cm</td>
</tr>
<tr>
<td>Victoria</td>
<td>05:17 UTC</td>
<td>13h 50m</td>
<td>9.0 cm</td>
</tr>
</tbody>
</table>

UTC EDT*  Elapsed Time  Product/Event
15:27 11:27 am 0:00  Earthquake occurs
15:29 11:29 am 0:02  Samoa short period alarm alerted
15:34 11:34 am 0:07  South Pacific regional alarm and autolocation of event in Tonga with initial magnitude 7.2 at the WC/ATWC in Alaska.
15:35 11:35 am 0:08  South Pacific regional alarm and autolocation of event in Tonga with initial magnitude 8.2 at the Pacific Tsunami Warning Center (PTWC) in Hawaii.

Water Level records from the Pacific Tsunami Warning Center (PTWC)

Above, Water level records provided by PTWC from Niue, Tonga, and Kahului, Maui, (Hawaii). Graphs indicate maximum peak–to–trough wave height (in metres) with elapsed time depicted.
Tonga, continued

New Zealand tide records

From ‘Tsunami records in New Zealand’ by Derek Goring, Mulgor Consulting Ltd., 24 Brockworth Place, Christchurch, New Zealand at http://www.mulgor.co.nz: “The direct path from the earthquake to the nearest port (Marsden Point) is only 2090 km, so we would expect the waves to arrive about 4 hours after the earthquake (07:30 NZST). Indeed, the waves that arrived at Marsden Point were so small, they can hardly be distinguished from the background meteorologically generated waves (called Far Infra Gravity or FIG waves). However, the tsunami was felt at other east coast ports, though the main waves did not arrive until 12 or more hours after the earthquake, so they must have taken a roundabout route.

Subsequently, NIWA has kindly supplied data from their sea-level recorder at Kaingaroa, on the northeast tip of Chatham Island, almost due south from the earthquake location, and 900 km east of mainland New Zealand. Unlike the NZ coast sites, there is almost no continental shelf off Kaingaroa, so it receives waves from the Pacific first. In the deep ocean, the waves are travelling at up to 800 kph, but on the continental shelf, they slow to less than 250 kph.”

DESHAIES, GUADELOUPE TSUNAMI, 20 MAY 2006, MONTSERRAT, LESSER ANTILLES, SOUFFRIERE VOLCANO TSUNAMI

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A major lava dome collapse took place at the Soufriere Hills Volcano on the morning of 20 May 2006. A helicopter flight in the afternoon confirmed that most of the lava dome has gone, together with some remnants of the 2003 lava dome, leaving a broad, deep, eastward sloping crater at the summit of the volcano. The volume of the lava dome was believed to be about 90 million cubic meters and most of this collapsed over a period of less than three hours. Views of the western part of the crater where ash venting is continuing were not possible but it is unlikely that there is significant dome

Maps showing partial arc of the Caribbean Island chain, with enlargement of Monserrat (left) and Guadeloupe (right) where survey was made.(Base map courtesy of University of Texas Austin, Perry-Castaneda Digital Map Collection; http://www.lib.utexas.edu/maps/).