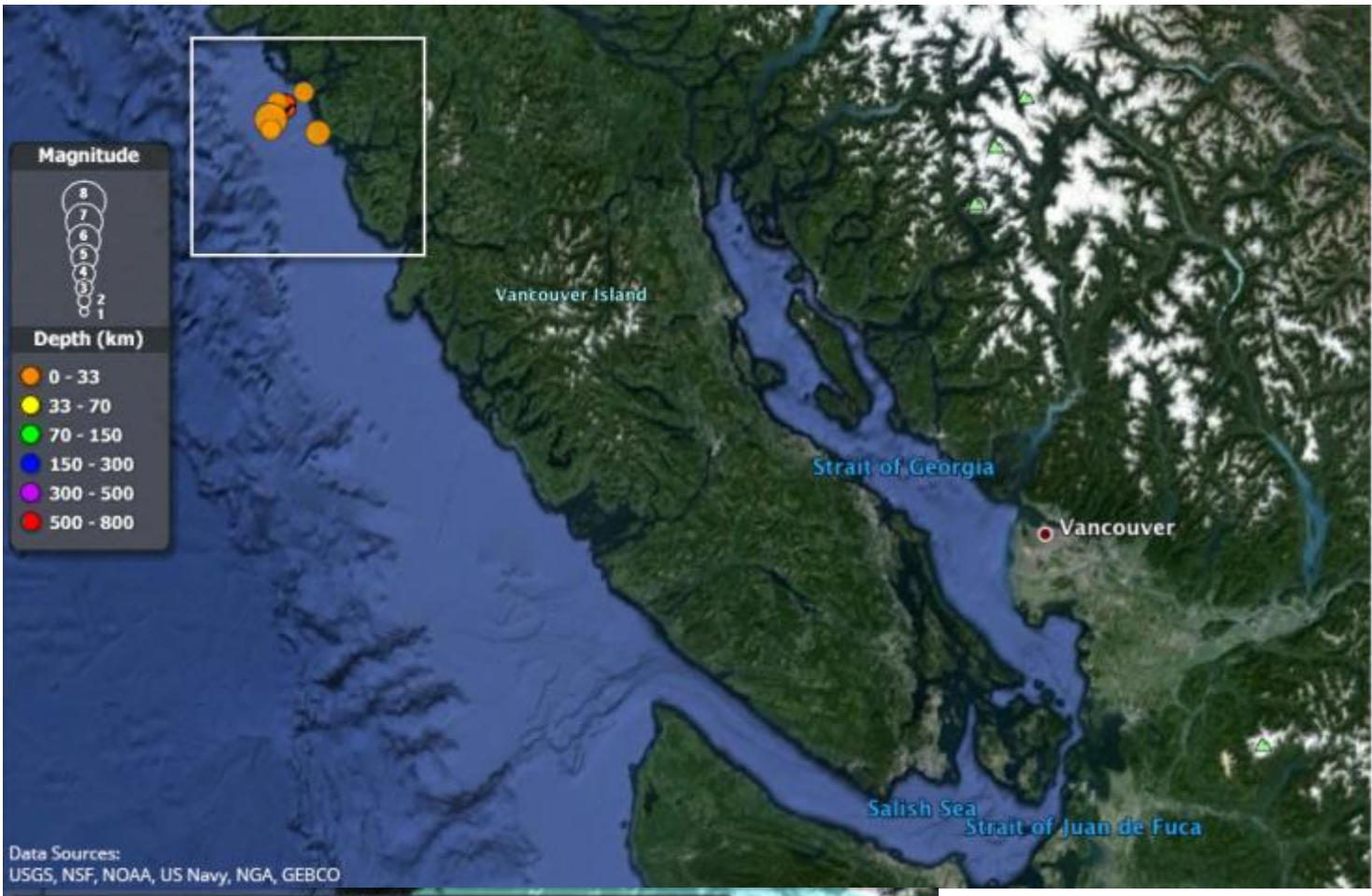
Magnitude 6.6 Earthquake

Submitted by Dwight Owens Thu, 2014-04-24 13:06

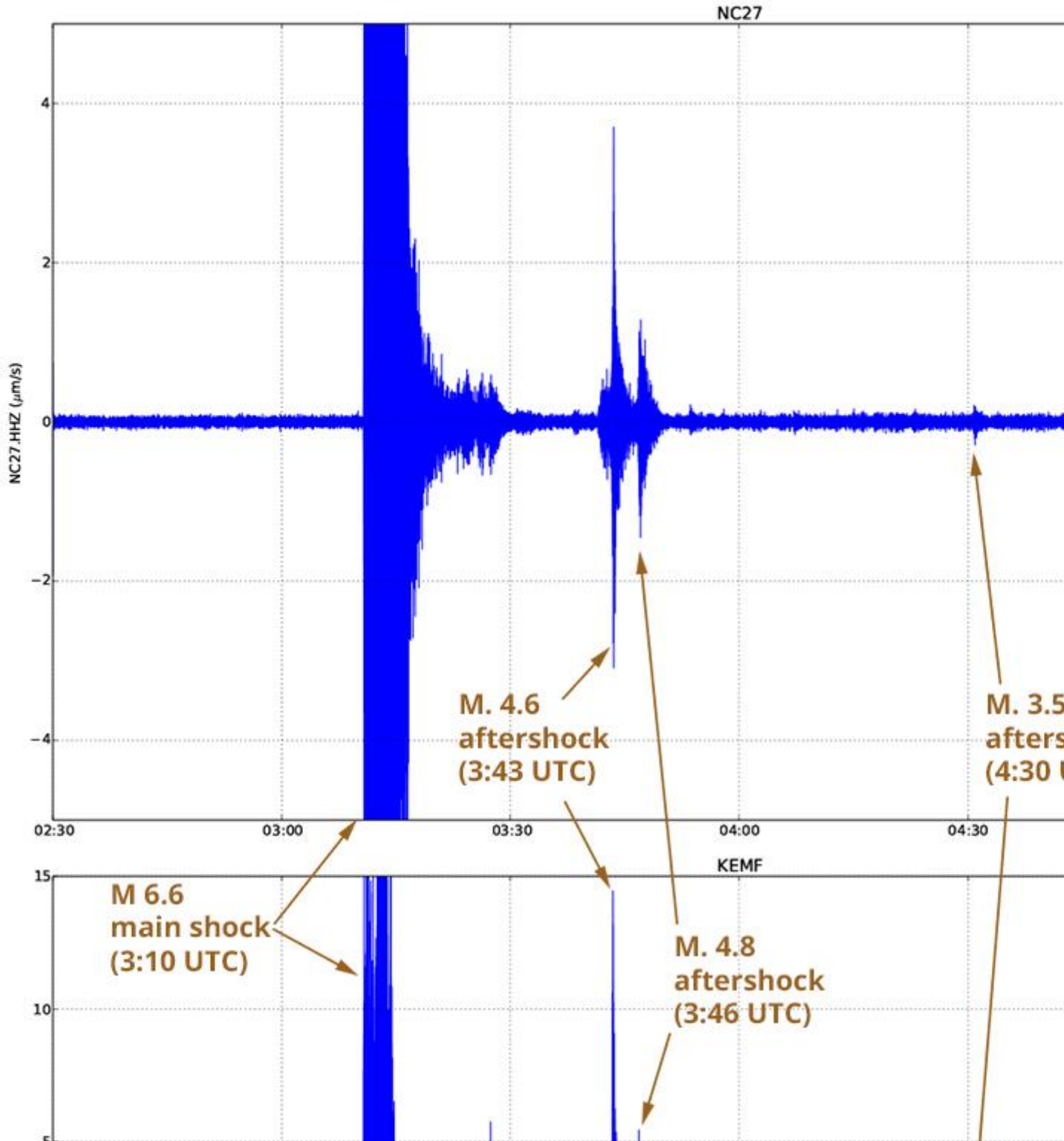
Multiple Ocean Networks Canada instruments recorded a magnitude 6.6 earthquake that struck beneath the seafloor off northern Vancouver Island at 8:10 PM (Pacific Daylight Time), 23 April 2014. Shaking from the earthquake was felt throughout Vancouver Island and by many people on the lower mainland in southwestern British Columbia.



Maps showing earthquake epicentre and aftershock locations (above, detail map shown above-right) and moderate to light shaking felt across northern Vancouver Island (lower map). The epicentre was 94 km south of Port Hardy, British Columbia and approximately 250 km north of NEPTUNE installations at Cascadia Basin. (Click to enlarge.)

Seismic Data

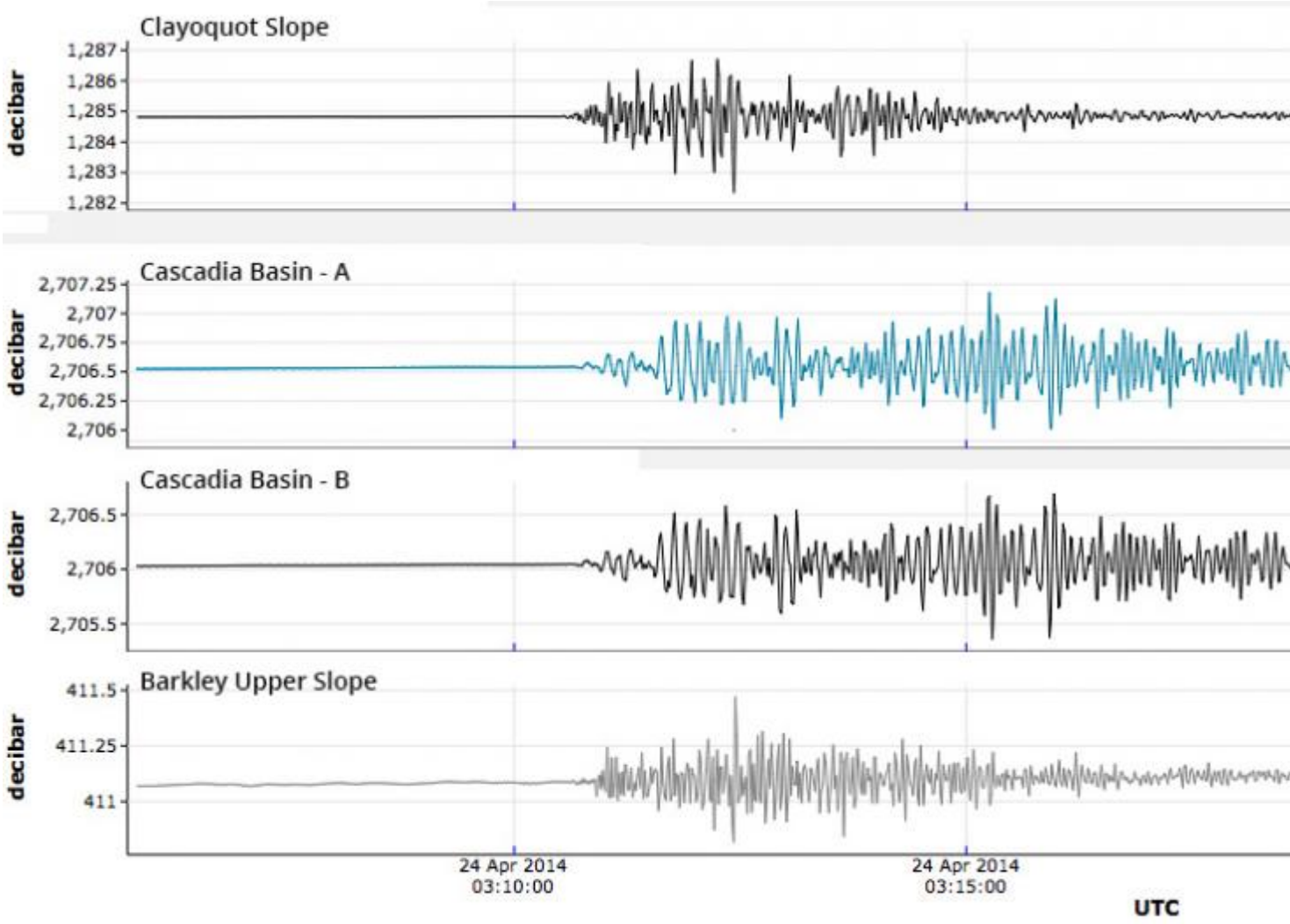
The main shock and numerous subsequent aftershocks were clearly recorded by seismometers at Cascadia Basin and Endeavour, as shown in data below. (Some of the smaller aftershocks shown in the seismic data from Endeavour may be associated with unrelated small local earthquakes that are frequently observed in this seismically active region.)



Earthquake initial shock and subsequent aftershocks recorded by the Cascadia Basin and Endeavour seismometers between 3:10-5:30AM, 24 April 2014 (UTC time) or 8:10-10:30 PM, 23 April 2014 (Pacific Daylight Time).

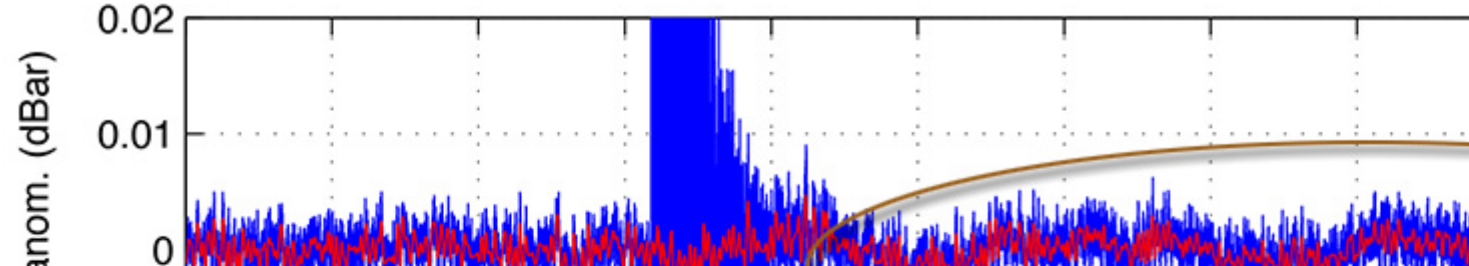
Bottom Pressure Recordings

Seafloor shaking was recorded by bottom pressure recorders at Cascadia Basin, Clayoquot Slope and Barkley Canyon shortly after the earthquake struck. However, there was no indication of a tsunami in the pressure data.



Seafloor pressure measured by bottom pressure recorders at three sites on the NEPTUNE Observatory. These
Pressure disturbances indicate seafloor shaking beginning approximately 3:11 AM, 24 April 2014 (UTC time) or

Seafloor pressure measured by bottom pressure recorders at three sites on the NEPTUNE Observatory. These recorders are situated at depths of 1285 m, 2706 m and 411 m. Pressure disturbances indicate seafloor shaking beginning approximately 3:11 AM, 24 April 2014 (UTC time) or 8:11 PM, 23 April 2014 Pacific Daylight Time).



Seafloor pressure anomalies (dBar) measured by bottom pressure recorders at three sites on the NEPTUNE Observatory. These recorders are situated at depths of 1285 m, 2706 m and 411 m. Blue lines show unfiltered wave height anomalies, while red lines are filtered to highlight longer-period waves such as tsunamis. Pressure disturbances indicate seafloor shaking (in blue) as the seismic waves passed, but there was no subsequent indication of a tsunami in the pressure data.?

Ocean Networks Canada instruments on (and in) the seabed of the Fraser River Delta also registered the shaking, providing scientists at Natural Resources Canada information on how the delta sediments, and pressures within, respond to large earthquakes. An unproven, but commonplace, perception is that earthquakes could cause failure on the delta; Natural Resources Canada scientists are testing this hypothesis.

Rumbles and Crackles

The sound of the earthquake was recorded by Ocean Networks Canada's low-frequency hydrophone in Cascadia Basin, approximately 250 km away from the epicentre. The noise generated was so loud it saturated the hydrophone input. The spectrogram and audio recording of the earthquake are shown below. This recording has been sped up 400% to make the earthquake audible. The crackling sounds were caused when the hydrophone sensor was saturated.

Strike-slip Earthquakes

Seismologist analyses and the absence of a tsunami suggest that this earthquake likely occured on a strike-slip (lateral) fault. Vertical displacement for strike-slip earthquakes is typically much less than may be expected from a major subduction earthquake. The following short video illustrates the distinction between strike-slip and subduction earthquakes.

Tags:

- earthquake
- tsunami
- Bottom Pressure Recorder
- seismometer
- Hydrophone
- marine acoustics

Categories:

- Data Highlights

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