

Andaman-Sumatra earthquake aftershocks

Hundreds of aftershocks have followed the Andaman-Sumatra earthquake on 26 December 2004. The magnitude 9.0 earthquake occurred where the Indo-Australian plate is being subducted under the Eurasia Plate. This subduction zone stretches from Burma in the west, to West Irian Jaya in the east.

The subduction zone is generally considered to be made up of three, approximately equal segments incorporating the Andaman Thrust, the Sunda Thrust and the Timor Thrust. The Boxing Day earthquake ruptured the entire 1200km length of the Andaman Thrust. The width of the fault was relatively narrow at 50km, and had an average slip of 5-10 metres.

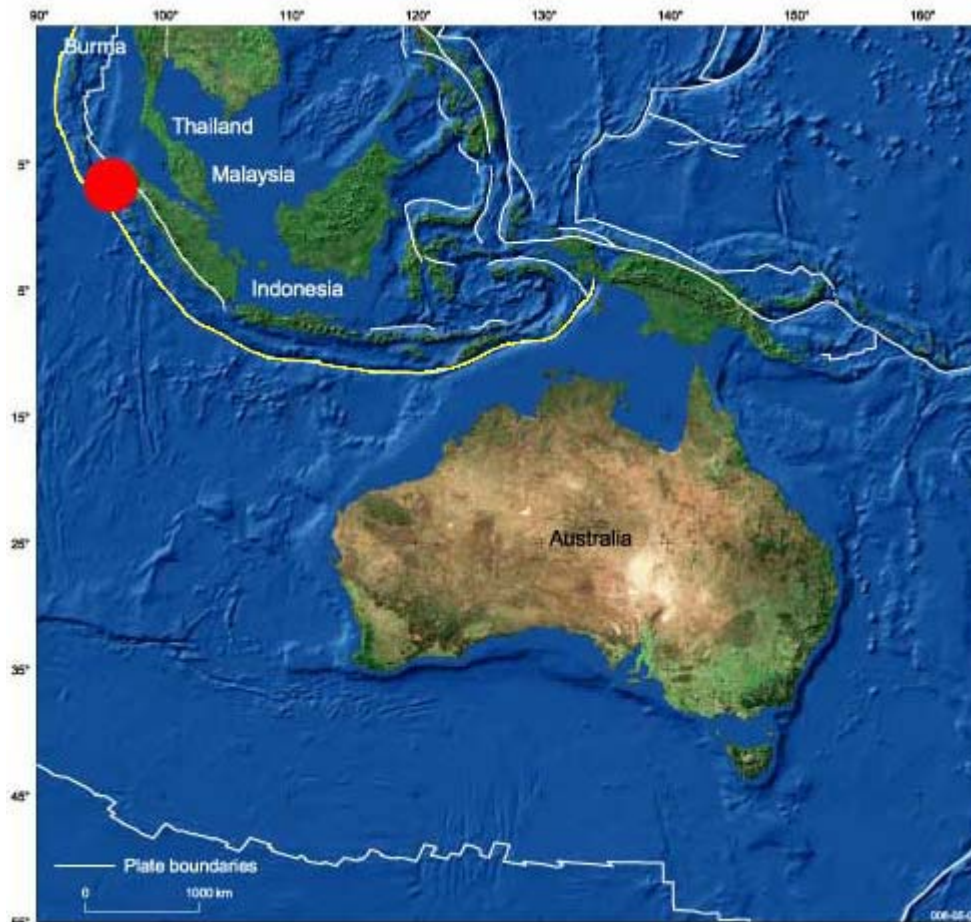


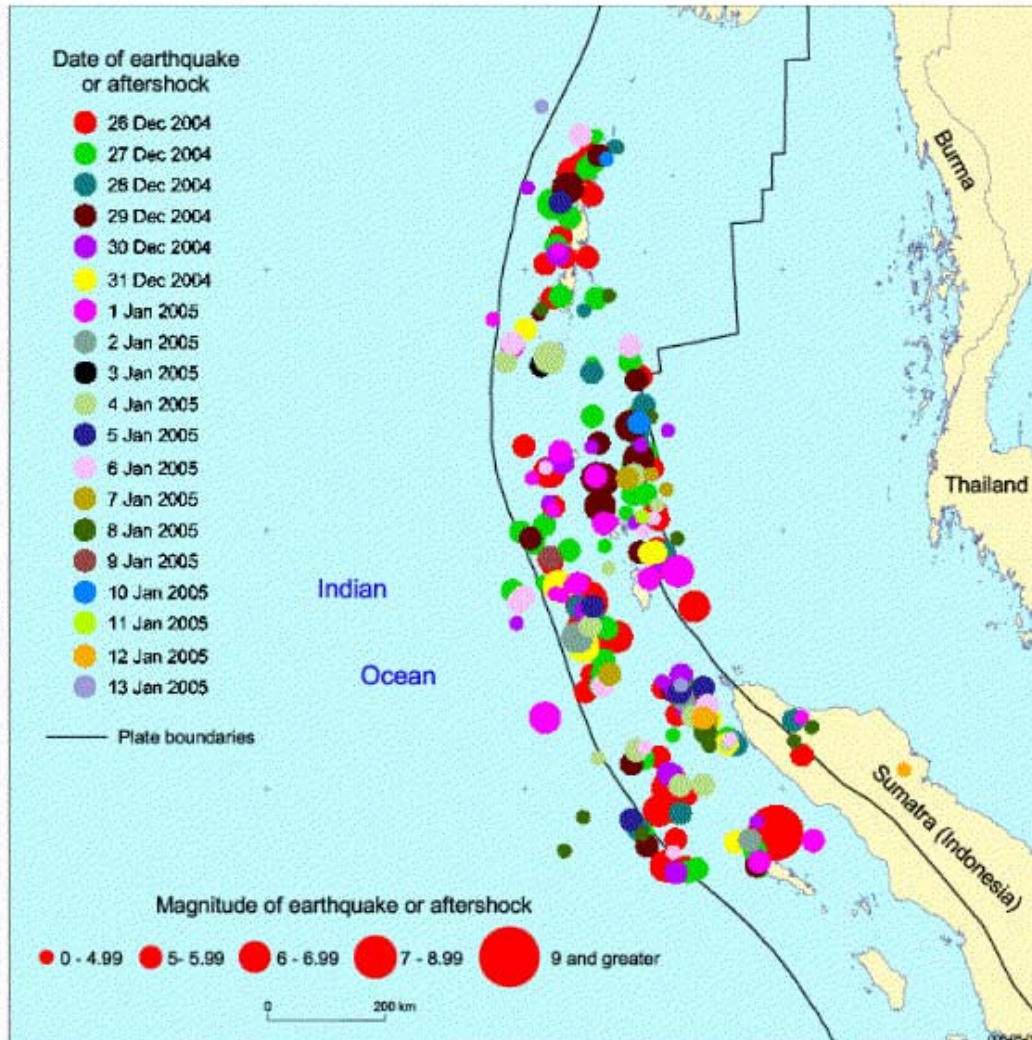
Figure 1. Location of the Andaman-Sumatra earthquake in relation to the plate boundaries. The subduction zone, including the Andaman Thrust, the Sunda Thrust and the Timor Thrust, can be seen in yellow.

As expected after a very large earthquake, there have been hundreds of aftershocks. By 17 January 2005, 125 aftershocks of magnitude 5.0 or greater, and hundreds of smaller aftershocks have been recorded.

Day	4.5-5	5-6	6-7	7-8	9+
26/12	?	26	7	1	1
27/12	?	18	3	-	-
28/12	15+		10	-	
29/12	19+	7	2		
30/12	10+	7	-		
31/12	13	6	2		
01/01	13	2	1		
02/01	5	3	1		
03/01	3	1	-		
04/01	6	10	1		
05/01	4	4	-		
06/01	5	5	-		
07/01	2	2	-		
08/01	4	-	-		
09/01	2	1	1		
10/01	-	2			
11/01	2	-	-		
12/01	1	2	-		
13/01	3	-	-		
14/01	-	-	-		
15/01	-	-	-		
16/01	-	-	-		
Number of earthquakes	106	18	1		
Cumulative number	125	19			

Aftershocks generally occur around the edge of the rupture surface, and essentially map out the extent of the fault. The aftershocks in this case show that the fault extends from near the coast of Burma down to Sumatra. The two animations below show the pattern of aftershocks following the Sumatran earthquake.

The accumulation of aftershocks between 26 December 2004 to 13 January 2005. The aftershocks are colour coded by day and size coded to reflect magnitude. Significantly there were no earthquakes above magnitude 5 recorded in the area for the month prior to the magnitude 9 earthquake on December 26



The number and size of the aftershocks decreased as the days passed, with most of the aftershocks occurring in the first 2-3 days. After 15 days the earthquakes above magnitude 5 became infrequent.

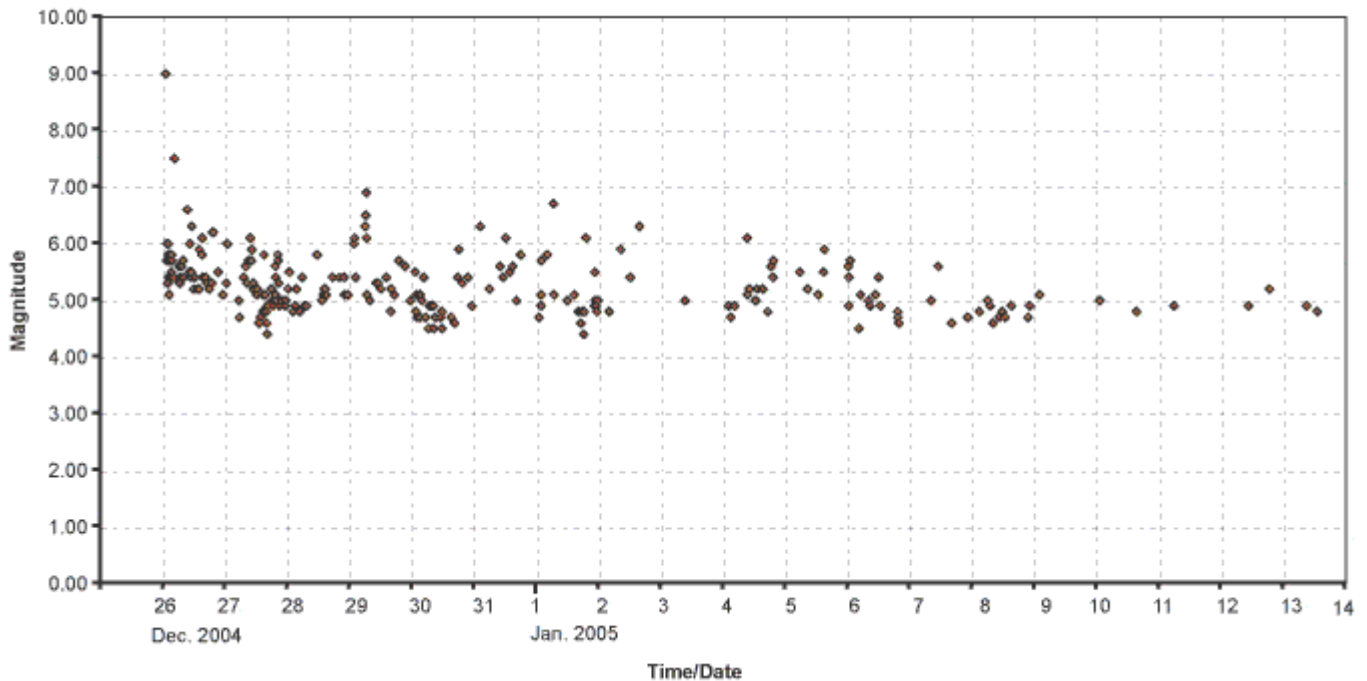


Figure 2. The number and magnitude of aftershocks declined steadily from 26 December 2004 to 13 January 2005

Aftershocks are expected to continue, however earthquakes above magnitude 5 will be very infrequent. This is a typical aftershock sequence for a large thrust earthquake. It is very unlikely that an aftershock will cause another tsunami, as they are seldom induced by earthquakes with a magnitude less than 7.2. A tsunami capable of causing damage 100s of kilometres away, normally requires a magnitude 7.5 to 8.0 earthquake. An aftershock of this size is very unlikely.