

Temporal changes of seismic structure around Iwatesan-Nanbu earthquake as inferred from artificial experiments (1998-2003)

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We investigate temporal changes of crustal structure around the 1998 M6.1 earthquake occurred south west of Volcano Iwate by analyzing seismic signals excited by artificial seismic experiments from 1998 to 2003. The first and second experiments (shots 1 and 2) were conducted at the fault area 1 month before and 2 month after the M6.1 earthquake occurrence. The following experiments (shots 3-6) were conducted at the same place every 1 or 2 year. The seismic signals were recorded by short period and broad band seismometers installed at permanent stations (GNB, ANS, AKM) of Tohoku University and a temporal station (MTI). We estimate phase difference of nearby two seismograms for the six shots by using a cross spectrum method. Then, we evaluate the seismic velocity changes of the structure during the two shots. The results show that the seismic velocity decreases about 1.5 % at MTI and GNB stations, which are located at the northern edges of the fault, for shot 1 and shot 2, during which the M6.1 earthquake occurred. Then, the seismic velocity increases of about 0.5 % is observed for the data from 1998 (after the M6.1 eq.) to 2002. From 2002 to 2003, about 0.3% velocity increase is observed again. We infer that these velocity decrease and increases observed from 1998 to 2002 are related to stress release and accumulation of the M6.1 earthquakes and/or structure changes due to the intense volcanic activity of Mt Iwate at this period. The velocity increases from 2002 to 2003 may be related with a significant crustal deformation and seismic swarm around Volcanoes Iwate and Akitakoma, which is located to the west of the fault, in June 2003.