S109-P004 **Room: Poster Session Hall** **Time: May 15**

The aftershocks for ultra-micro-earthquakes seen in 25Hz continuous recordings with Ishii strainmeter within M2 source area

Akihito Yamamoto[1]; Hiroshi Ogasawara[2]; Jun'ichi Takeuchi[3]; Naoyuki Shimoda[2]; Makoto Naoi[2]; Ken Morishita[4]; Hiroshi Ishii[5]; Shigeru Nakao[6]; Aleksander Mendecki[7]; Gerrie van Aswegen[7]; Patrick Lenegan[7]; Shana Ebrahim-Trollope[8]; Sumitomo Norihiko International Research Group for Semi-controlled Earthquake Generation Experiment at South African Gold Mine[9]

[1] Ritsumeikan Univ.
; [2] RitsumeiUniv.; [3] RitsumeiUniv.
; [4] Physical Science, Ritsumeikan Univ; [5] TRIES; [6] Kagoshima Univ.; [7] ISSI; [8] Geohydroseis CC; [9] -

The International Research Group for the Semi-controlled Earthquake-generation Experiments in South African deep gold mines (SeeSA) had an experimental site at the Bambanani mine. At the site, an Ishii strainmeter has been installed in the potential source area of earthquakes (smaller than M3). The meter has been monitoring strain continuously with a 24 bit, 25 Hz resolution (Ishii and Nakao et al. [Seismological Society of Japan 2000 Fall Meeting]). This allows us to observe micro-earthquakes (less than M3) and aftershock activities associated with mining.

We developed an effective noise reduction method. Applying this method to strain recordings, we were able to detect about 2.4 times more earthquakes (smaller than or equal to M-1.0) than the routine event-trigger seismic monitoring system of the mine does. We emphasize that the Ishii strainmeter detects much more earthquakes than the seismographs at the mine. This enabled us to analyze seismicity changes in more detail.

Taking the following into account, we designed the noise reduction procedure. The strainmeter has a poorly dumped impulse response to a micro-earthquake; this is masked with background noise (amplitude 5-10 nano strain), which is the random electric noise independent of one another for channels. So, in order to reduce noises and effectively pick up events, first we band-pass-filter out the impulse responses; then, to eliminate the trend, we differentiated it; lastly, to reduce random, independents noises for each channel, we calculated a product for two channels.

We applied the method to the data for a 1-month period in February 2003. An M2.5 event occurred within 100 m in this term, so seismicity was active. In addition, strainmeter recorded 12 strain steps over 1E-7 (over 0.01 MPa) in this term. We can investigate the micro-earthquakes (smaller than M3) and aftershock activities using strainmeter recording in detail.

At the Bambanani mine, the blasting in every weekday afternoon activates seismicity considerably, not allowing us to clearly see the triggering of seismicity by earthquakes.

So, we searched the off-blasting hour for cases of significant seismicity change, and found two cases. Those were on 2003/Feb/19 by M0.4 event (42 m from the strainmeter), and on 2003/Feb/8 by M-1.0 (46 m). The seismicity was activated from 3 events / hour to 12 events / hour, and from 2 events / hour to 14 events / hour respectively. The durations of seismicities were 1.5 and 1 hour, respectively. The events detected in this period were respectively 19 and 14 events. Both activated seismicities contained a little number of remote, small earthquakes, which took place not in synchronization with an increase in the strain event rate. So, it is considered that the activated seismicities are aftershocks for the mainshocks of M0.4 and -1.0 in the vicinity of the strainmeter. Also it is noted that only the larger mainshock (M0.4 on 19 Feb) is followed by significant postseismic strain change.

We will detail our attempt further in this poster.