Miyakejima Island, which is located at 170 km to the south of Tokyo, Japan is an active volcano of basaltic magma. The 2000 activity started on June 26 – 27, 2000 with magma ascent and migration northwestwardly, followed by caldera formation in July and large amount of gas emissions from late August. We analyze the ambient seismic noise recorded at three stations (MKK, MKT, and MKS) around the Miyakejima Island operated by NIED to study the behavior of the volcano structure associated with the 2000 activity. We apply cross correlation analyses to the continuous records, which are recorded at a sampling frequency of 100 Hz with an A/D resolution of 16-bit, of short period seismometers (1 s) of vertical component for the period between July 1999 and October 2002. We set a time window with a length of 60 s and calculate the cross correlation functions (CCFs) for each station pair. We stack the CCFs for each month and bandpass filter the stacked data at frequency band 0.4 – 0.8 Hz. The stacked CCFs, which represent the Green functions between two stations, at station pairs MKK – MKS (the distance is 2.4 km) and MKT – MKS (4.8 km) show wave packets with large amplitudes at both sides (positive and negative time delay). The stacked CCFs at station pair MKK – MKT (3.8 km) is one sided probably due to inhomogeneous distribution of propagation direction of ambient seismic noise, so we do not use the data for the following analyses. Comparing the calculated CCFs for different periods with that of October 2002, we observe small phase differences of the main wave packet, which propagates at a group velocity about 0.8 – 1.0 km/s (Figure 1). We measure the travel time difference by reading the time delay of peak amplitudes appeared in main wave packets in both positive and negative time delay. Our results show that for station pair MKK – MKS, whose path crosses the northern part of the island, we observe velocity increase about 1.6 % after the 2000 activity. For MKT – MKS, whose path closely crosses the newly formed caldera, we observe velocity decrease about 1.5 % after the 2000 activity. Such velocity increase and decrease observed at Miyakejima might be caused by the stress increase or decrease in the shallow structure, gas permeation in the volcanic edifice, and other phenomena associated with the 2000 volcanic activity.

Fig 1. Examples of phase differences observed at MKK – MKS and MKT – MKS for frequency band 0.4 – 0.8 Hz.