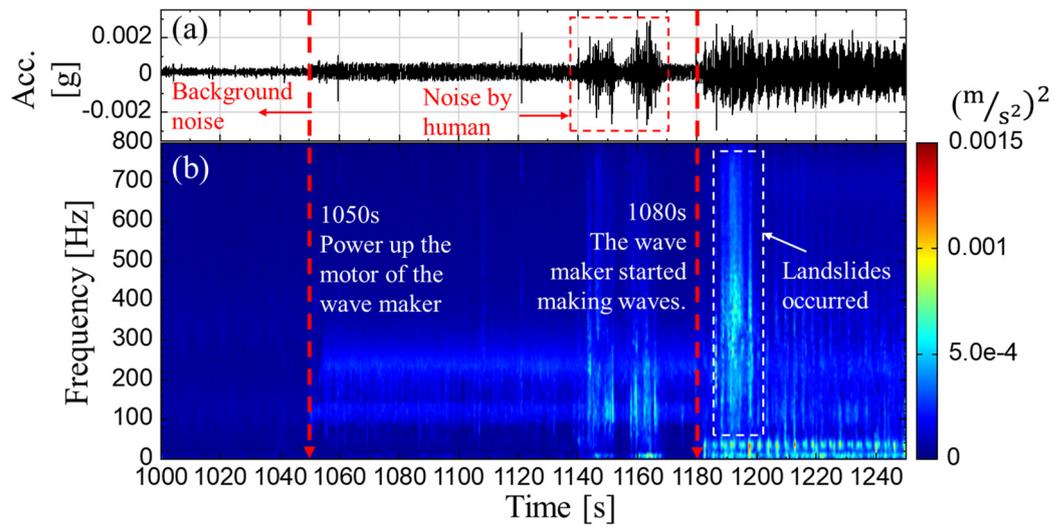


**Supplementary Figures S1, S2 and S3:**

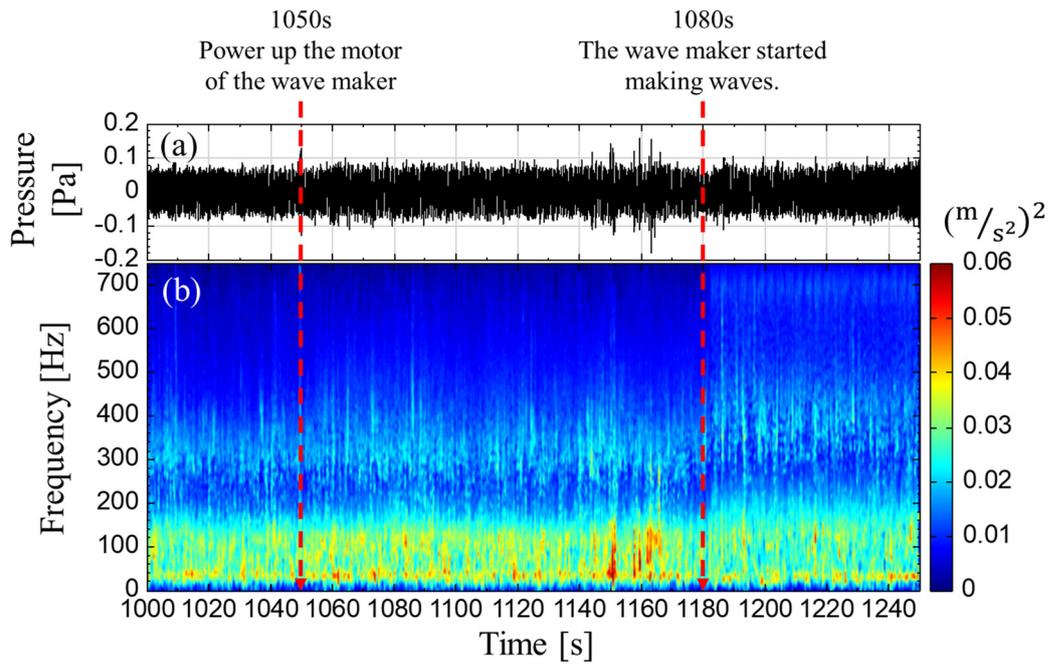


**Figure S1** Series sideview images of the slope model from Stage 1 to Stage 3



**Figure S2** Environmental and human noise of seismic signals

Figure S2 is for the Acc 2 seismic signal and time-frequency spectrum during 1000s ~ 1250s. Figure S2 a & b show that after the wave maker's motor is turned on at 1050s, the signal's amplitude increases, and distinct light blue traces appear in the 50 ~ 350 Hz of the time-frequency spectrum. This is the noise generated by the motor powering up. Man-made noise, due to the significant vibrations caused by people moving, results in a noticeable increase in the amplitude of the seismic signal from 1140s ~ 1170s (Figure S2a).



**Figure S3** Noise of acoustic signals due to the wave maker

Figure S3 is for the acoustic signal and time-frequency spectrum during 1000s ~ 1250s. In 1050s, Figure S3b shows that the energy does not intensify at 1050s. This might be because the instrument is far from the wave maker, and the acoustic signals produced by the wave maker are not easily recorded by the microphone. At 1080s, as the wave maker started generating waves, the sound of the water increases. At this time, the colors in the 0~700Hz range of the time-frequency spectrum turn to bright yellow and light blue, and the acoustic energy rises.

## Supplementary Materials: Tables S1 and S2

Table S1 Specifications of the accelerometers

Specifications	Wilcoxon 731A
Sensitivity	10 V/g
Frequency response	0.1 ~ 300 Hz ( $\pm 10\%$ ) 0.05 ~ 450 Hz ( $\pm 3$ dB)
Acceleration range	0.5 g peak
Resonance frequency	750 Hz
Height (mm)	53.3
Diameter (mm)	62.2
Weight (grams)	760

Table S2 Specifications of the microphones

Specifications	ROGA MI-17sw
Sensitivity	$\approx 50 \text{ mV/Pa (1 kHz)}$
Frequency response	20 ~ 4,000 Hz ( $\pm 0.5\text{dB}$ ) 4 ~ 20,000 Hz ( $\pm 1.5\text{dB}$ )
Max. peak SPL	$\approx 130 \text{ dB (ref. } 20\mu\text{Pa)}$
Total length	93 mm