

Tsunami record of Peru earthquake (06/23/2001; Mw8.2) detected by GPS buoy offshore Ofunato, Japan

Teruyuki Kato[1], Shunichi Koshimura[2], Yukihiro Terada[3], masao kinosita[4], Toshihisa Moriguchi[5], Masayuki Kanzaki[6]

[1] Earthq. Res. Inst., Univ. Tokyo, [2] ERI, [3] Technical Research Institute, Hitachi Zosen Corporation, [4] HZ KENDEN, [5] Hitachi Zosen KanS, [6] HZS

We have developed a new tsunami detecting system using a GPS buoy, which employs a real-time kinematic positioning technique. A long-term experiment started on January 23rd, 2001, offshore Ofunato city, Tohoku district, Japan. The system has been operated without any serious trouble, except intermittent loss of lock and transmission problems. At the arrival of a small tsunami generated by the Peru earthquake of June 23rd, 2001 (UT) with Mw8.1, the GPS buoy detected a significant sea level change about after one day of the earthquake. Figure 1 compares tsunami record obtained by GPS (above) and tide-gauge record (below). Although the GPS buoy registers not only tsunami but also wind waves with much bigger amplitudes, wind waves have much shorter period relative to tsunami. Thus, we applied 60second moving average to the original record and the resultant long period records are shown in Figure 1. The figure shows that the tsunami looks arrived at around 4AM JST with about 10cm of amplitude. It can be also seen that the wave form of the GPS buoy is similar to the nearby tide-gauge record at Ofunato station. We also conducted a numerical simulation and the results are shown in Figure 2. Figure 2 shows that the arrival of tsunami is somewhat earlier than as detected in eye-view examinations. However, the observed records clearly show consistent wave form as the simulated one. Thus, we could safely conclude that our tsunami recording is capable of detecting tsunami of a few centimeter level. Given the present results, we decided to extend our experiment to two more years at maximum. During this period, we try to conduct long distance telemetry of sea-level monitoring for future deployment of an operational buoy.

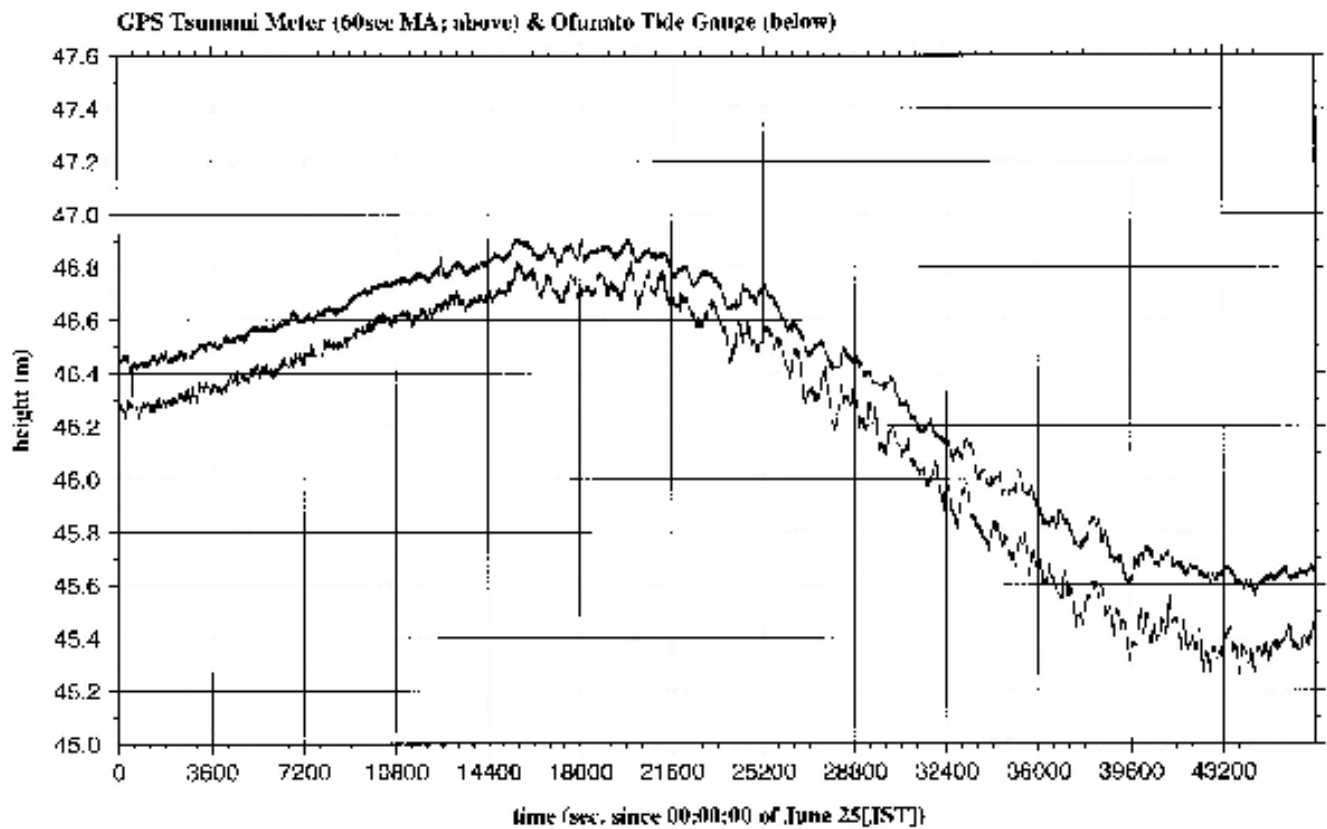


図 1 : (上) GPS津波計記録 (60秒移動平均後) と (下) 大船渡検潮記録 (15秒値) .

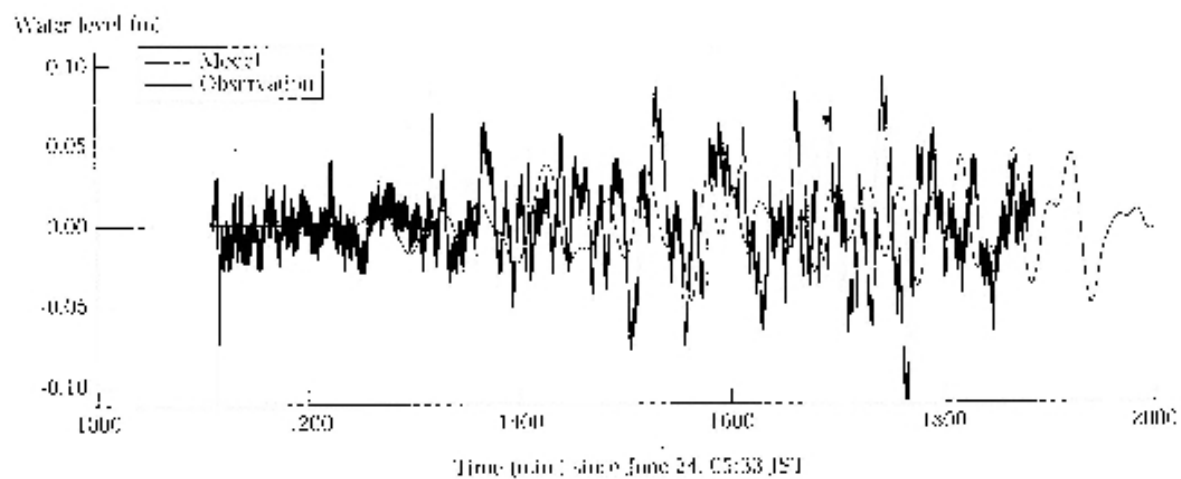


図 2 : 図 1 の津波記録 (潮汐成分除去後) と シミュレーション結果