

## Toward rapid source process analysis for great earthquake using teleseismic body waves

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Source processes for great earthquakes are now obtained in near-real-time by teleseismic body wave analyses. Green's functions of most teleseismic body waves analyses are based on ray theoretical method, but such methods have the following two problems for great earthquakes source process analyses: difficulty in calculating all later phases such as PP waves and impossibility of calculating very long period phase called a W phase. To solve these problems, we introduced the complete Green's functions (i.e., all body and surface waves) calculated by Direct Solution Method. We show that source process analyses results of 2011 Tohoku-Oki earthquake (Mw7.3), 2007 Solomon earthquake (Mw8.1), and 2010 Chile earthquake (Mw8.8) using the complete Green's functions. We also analyzed these earthquakes using the conventional ray theoretical Green's functions in order to make clear the problems of ray theoretical method. The obtained 2011 Tohoku-Oki earthquake source process using complete Green's functions is not so different from ray theoretical Green's functions. However, the source process of 2007 Solomon and 2010 Chile earthquake using conventional ray theoretical Green's functions are quite different especially later part of source process compared with that of using the complete Green's functions. These difference mainly caused by neglecting W phase of the ray theoretical Green's functions calculation. When you analyze the great earthquake in near-real-time using ray theoretical Green's functions, we recommend that you should be use the station of small amplitude W phase as much as possible and may be better use velocity observed seismograms rather than displacement observed seismograms.

Keywords: teleseismic body waves, Green's functions, ray theory, W phase, great earthquake