

広帯域MT法時系列データからMT応答関数を推定する手法の改良

小河 勉 [1]
[1] 東大・地震研

An improvement of the estimation scheme of the MT responses from the wide band MT time series

Tsutomu Ogawa[1]
[1] ERI, Univ. Tokyo

Spread uses of the wide band MT data receivers which had been introduced since 1990s have enabled us to obtain MT responses over wide frequency band and area. The series of success owes not only to the well-composed hardwares but also the analyzing softwares provided and supported by the enterprise producing the hardwares.

However in cases of analyzing data obtained in noisy area or data in noisy frequency bands, it seems that the softwares give sounding curves or their parts which are less reliable. The present author has performed the wide band MT survey over noisy area and period: Tokai district in the central part of Japan where electric power generating stations and transformer substations are distributed, where high voltage electric power lines compose tremendous dense networks and where many industrial factories and long DC electric railways with heavy traffic exist, in summer 2008 during which extremely many lightning in these years took place (Ogawa et al., 2008, SGEPPS Fall meeting). In this case, obtaining a series of MT response functions with adequate quality requires more careful analysis than ordinary use of the ordinary-used softwares.

First, instead of applying the cascade decimation method (Wight and Bostick, 1980) to the time series, the method of which is adopted by the softwares to estimate Fourier coefficients, the author develops a weighted least square scheme to reduce the effects of noises which are singular but have high power, biasing the estimated coefficients, with the weights given with automatic trimming with sorting the time series. Second, instead of the series of frequencies for estimating MT responses adopted by the softwares, the author adopts another series including the frequencies of the commercially-supplied electric power and their overtones. This treatment enables estimating the Fourier coefficients at the frequencies of the time series directly, and as a result, directly disregarding their contermination in estimating MT responses at other frequencies.

The comparison between the ordinarily-determined and carefully-determined MT responses will be shown.