

Self-inconsistency in the method of Shen et al. (1996) to estimate strain rate distribution

*Tomohisa Okazaki¹, Yukitoshi Fukahata²

1. Graduate School of Science, Kyoto University, 2. Disaster Prevention Research Institute, Kyoto University

In estimating strain rate distribution on the Earth's surface, the method proposed by Shen et al. (1996) has been commonly used (e.g., Sagiya et al., 2000). Its advantage is that the velocity and strain rate can be simultaneously obtained at each point, and that they vary smoothly in space. Then a question arises: although the velocity and its derivative (strain rate) is independently obtained, are they consistent with one another? We show that the result is negative, that is, self-inconsistency exists in the method of Shen et al. (1996).

Let us consider a scalar function (y) of one-dimensional parameter (x). We derive analytic expressions of the field (y) and its derivative (v) following the method of Shen et al. (1996), and inspect their consistency. It turns out that $dy/dx=v$ does not hold true except for trivial cases (the same conclusion can be obtained for higher dimensions). We discuss the cause and degree of the discrepancy with the aid of synthetic data analysis.