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# Numerical experiment of sequential data assimilation for crustal deformation between Tonankai and Nankai earthquakes

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A possible estimation procedure for the time interval between the forthcoming Tonankai (Tokai) and Nankai earthquakes is sequential assimilation for the crustal deformation data which will obtain from hour to hour following the occurrence of the Tonankai (Tokai) earthquake. We demonstrate the numerical experiment of the assimilation using the surface deformation calculated from the results of earthquake generation cycle simulations along the Nankai trough. For the observation noise, we use the real ocean bottom pressure gauge data excluding the tidal modulation at a station of the Dense Oceanfloor Network System for Earthquakes and Tsunamis (DONET) in the Tonankai source area . As a data assimilation method, we use Sequential Importance Sampling (SIS) which is a kind of particle filter. Data assimilation is done sequentially every 5 hours. As the data increase, the estimated time interval between Tonankai and Naknai earthquakes becomes closer to the "true" time interval. How early the true value is estimated depends at least on the noise level and crustal deformation pattern. It is important to note that the real noise level of the pressure gauge data of DONET including the long-term drift is small enough to distinguish the simulated crustal deformation patterns for the different cases in the time interval.