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Kanto Asperity Project -Background and future prospects-

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The Kanto region (Tokyo and the surrounding area) is located at an island arc-island arc collision zone and a zone where Pacific and Philippine Sea plates are subducting. Great earthquakes along the Sagami trough, where the Philippine Sea slab is subducting, have repeatedly occurred. The 17 03 Genroku and 1923 (Taisho) Kanto earthquakes caused severe damages in the metropolitan area. The recurrence periods of Taisho- and Genroku-type earthquakes are about 200-400 and 20 00 years, respectively (e.g., Earthquake Research Committee, 2004).

Slow slip events have also repeatedly occurred in an area adjacent to the asperities of the great earthquakes, off Boso peninsula (e.g., Ozawa et al 2007). In the cases of Nankai and Cascadia, slow slip events occur at deeper levels than the asperities, in a transition zone between the asperity and a region of steady slip. In contrast, slow slip events in the Kanto region have occurred at relatively shallow depths, at the same level as the asperity, raising the possibility of friction controlled by different conditions (materials, fluid, or surface roughness) to those (temperature and pressure) encountered at Nankai and Cascadia.

The Kanto Asperity Project (KAP) have been submitted to IODP to know the shape of asperities and slow slip region, their physical properties, and tectonics along the Sagami trough, which are considered to control the occurrence of the great earthquakes and slow slips.

The KAP consists of three research components. The first component is shallow drilling, coring, and logging at several sites distributed in wide area for the combined purposes of geological characterization (sediments, basements, and faults), tectonic reconstruction (collision, accretion, and rotation), earthquake history inferred from sediments, and in situ stress measurements. The second is long-term geophysical monitoring with wide area network, focusing on understanding the geometrical and geophysical situation of the system of asperities and non-asperities. The third one is coring and logging plate boundaries in asperity and slow slip regions to measure physical properties. Information obtained in this plan may be effective to modify simulations of earthquake cycles, strong motion, and tsunamis for seismic hazard assessment.

We discussed a new concept on scientific goals in the last year. As mensioned in the companion paper (Sato et al. 2010, this meeting), we focussing on the different behavier in three patches, two asperities of the Kanto and Genroku earthquakes, and a region of slow slip events.
-Taisho (1923) asperity: recurrence time is 200-400 years. Coupling rate is 80-100 %.
-Genroku (1703) asperity: recurrence time is about 2000 years. Coupling rate is about 10-30 %. This asperity may always move with the Taisho asperity.
-Slow slip asperity: recurrence time is 5-7 years. Coupling rate is 70-100 %.
The three patches raise two key questions.
1) Why these different asperities exist under the same depth, this means the same pressure and temperature conditions.
2) What is the slow slip? Can the slow slip events be used for assessing earthquake generation

models?
We have prepared new three proposals to answer these questions.

A new monitoring proposal will be introduced by Sato et al. (2010, this meeting). We will introduce the other two proposals and the whole future prospects of the KAP.

Keywords: asperity, the 1923 Kanto Earthquake, the 1703 Genroku Earthquake, slow slip, scientific drilling, monitoring