

# Earth and Ocean Dynamics

We study the dynamics of the solid earth covered with lithospheric plates, and dynamic phenomena of ocean and atmosphere, at local and global scales.

## [STAFFS]

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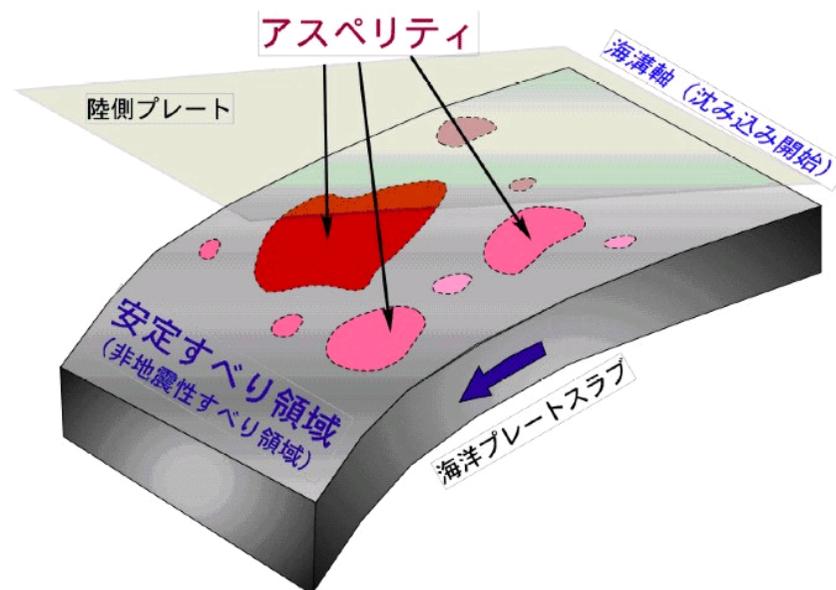
Research Associate: Takumi Murakoshi

## Main Research Themes

### (1) Research on large earthquake occurrence and volcanic eruption

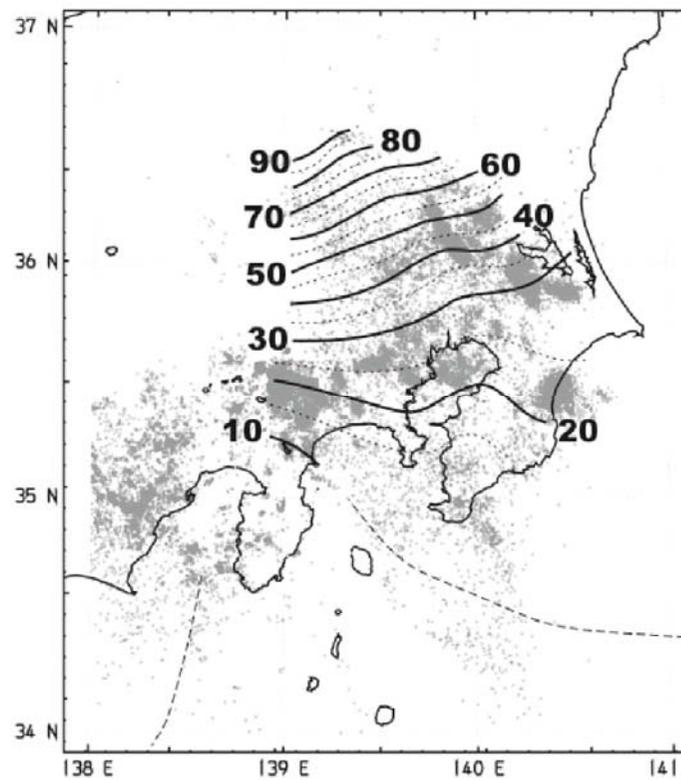
#### 1-1. Occurrence mechanism of large earthquakes at subduction zones

Physical aspects of ‘asperities’ connecting mechanically the contacting plate interface, etc



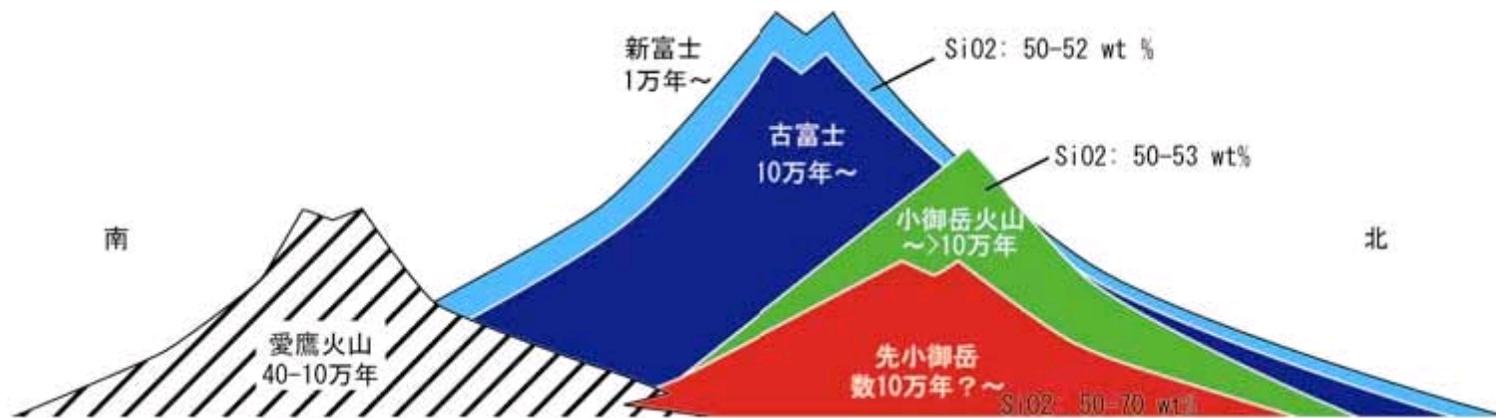
プレート沈み込み帯のプレート境界面におけるアスペリティの模式図。

1-2. Large earthquake activity in and around the metropolitan area, Japan  
Large seismic events due to the subduction of the Philippine sea plate beneath the metropolitan area, etc



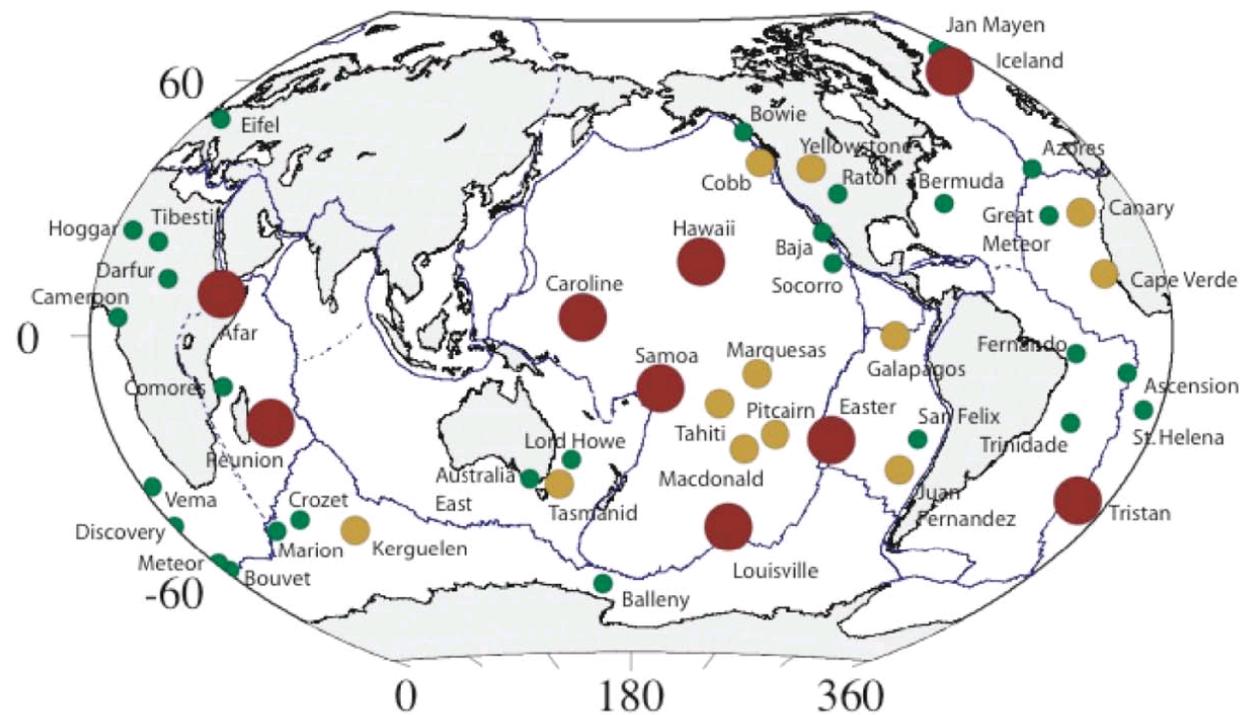
### 1-3. History of the distribution of volcanoes in Japanese island arc and its implications

The background of the time-space change of volcanic eruption sites, etc



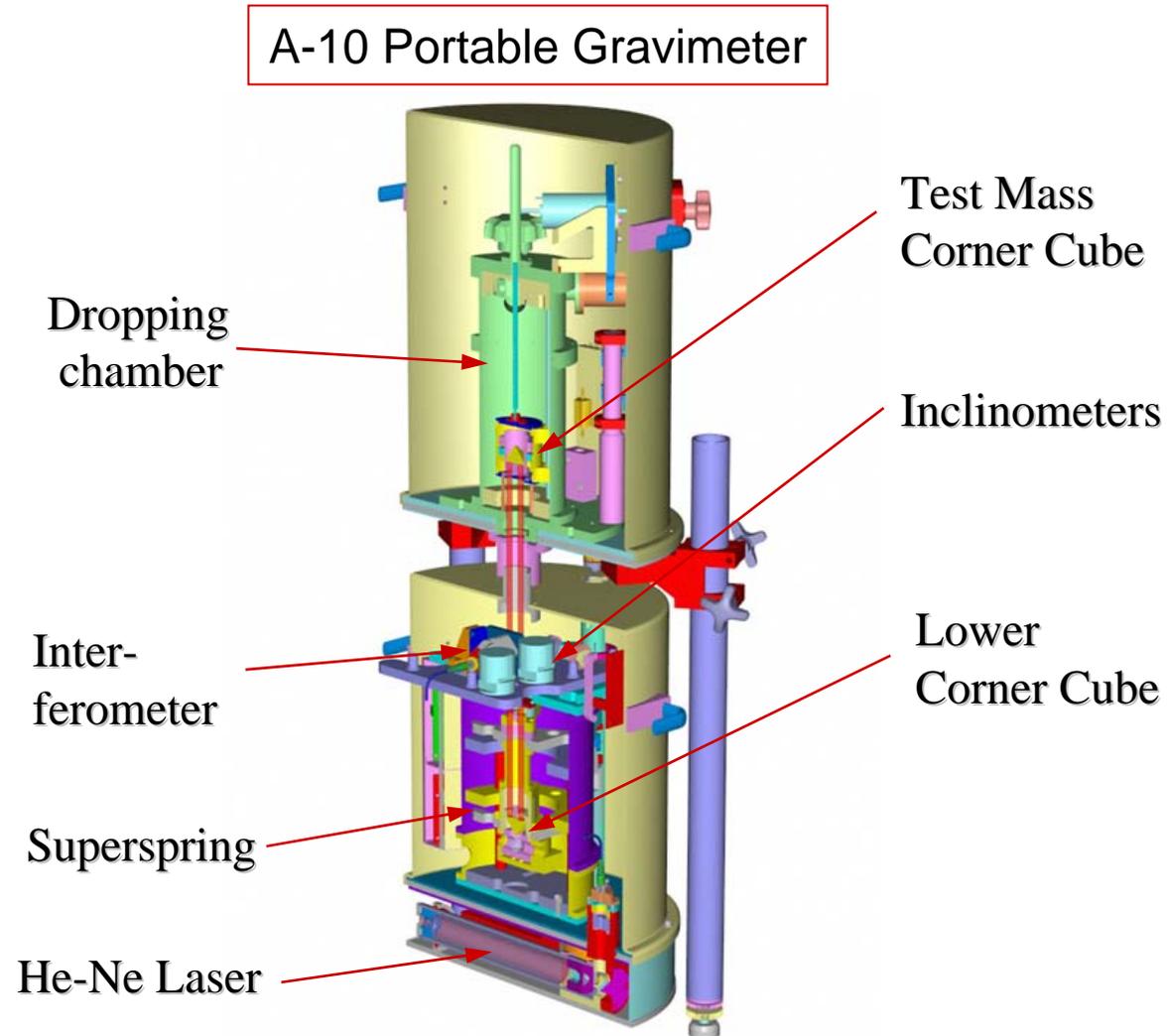
#### 1-4. Science on active volcanoes

Volcanic eruption vs. the internal structure, formation process of the island arc volcanoes and hotspots in relation to the crustal stress field, numerical simulation of volcanic hazards, etc



1-5. Development of research equipment for solid earth sciences

Development of six-component seismic wave sensor, distance ranging on sea-floor, etc



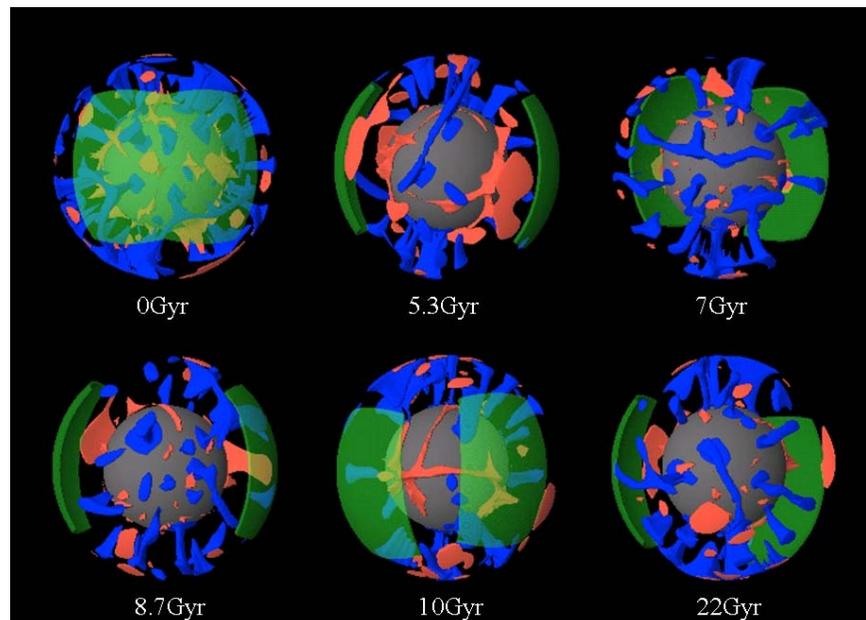
## (2) Research on the internal structure and dynamics of the earth

### 2-1. Structure of the Japanese island arc and its vicinity

Seismic structure of wave velocities and wave decay, in addition to the density structure, in the metropolitan area as well as in Kyushu

### 2-2. Dynamics of mantle convection

Mechanical aspects of whole mantle convection, numerical simulation of super plumes, correlation of plume activity and hotspots, etc



### (3) Research on plate tectonics

#### 3-1. Investigation of plate motions

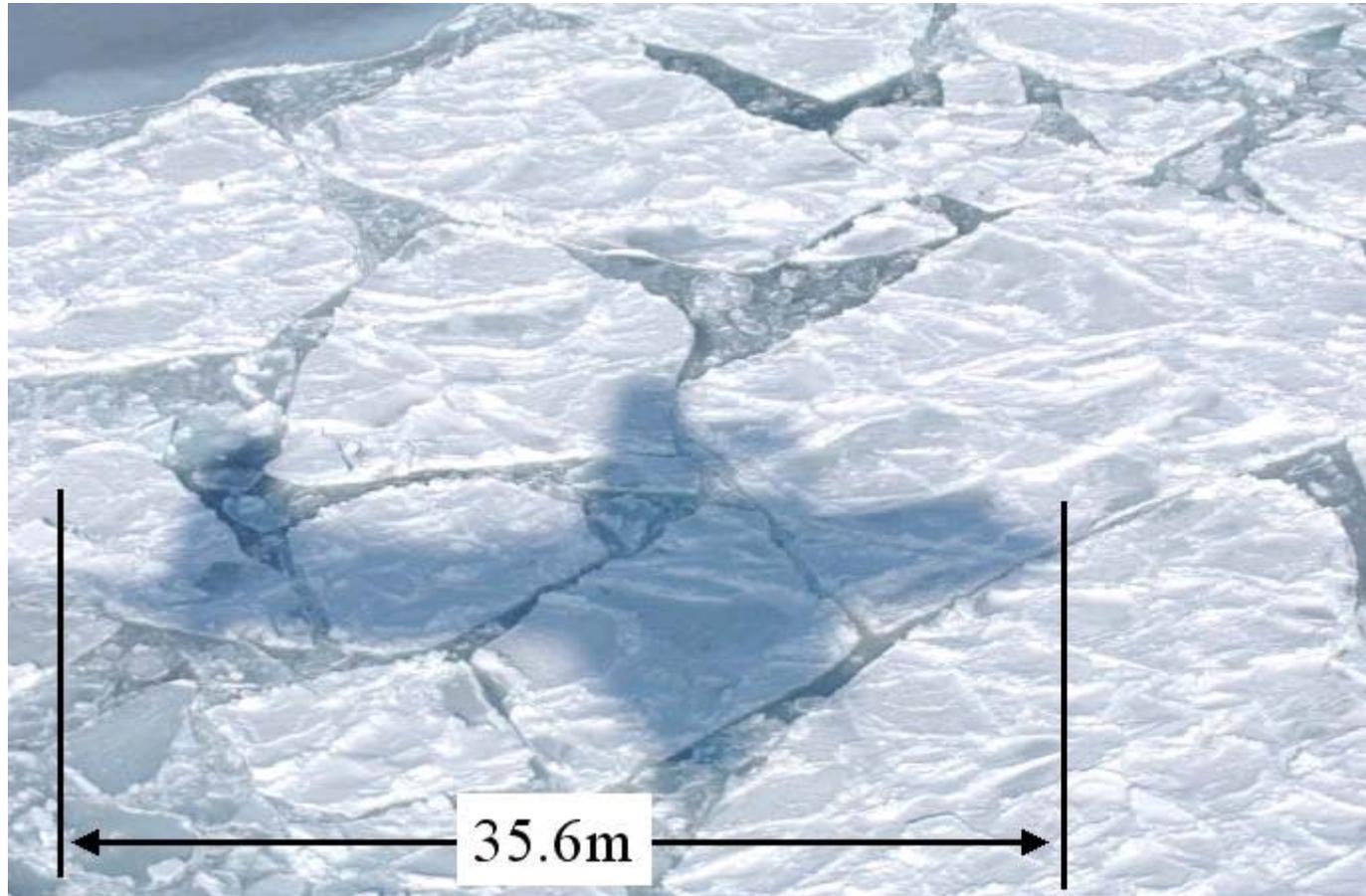
Plate motions in the Japanese island arc and the Southeast Asia region

#### 3-2. Physical research of back-arc basins

Back-arc opening systems and its relation to plate dynamics in the western Pacific, etc

(4) Studies on the heat exchange between ocean and atmosphere

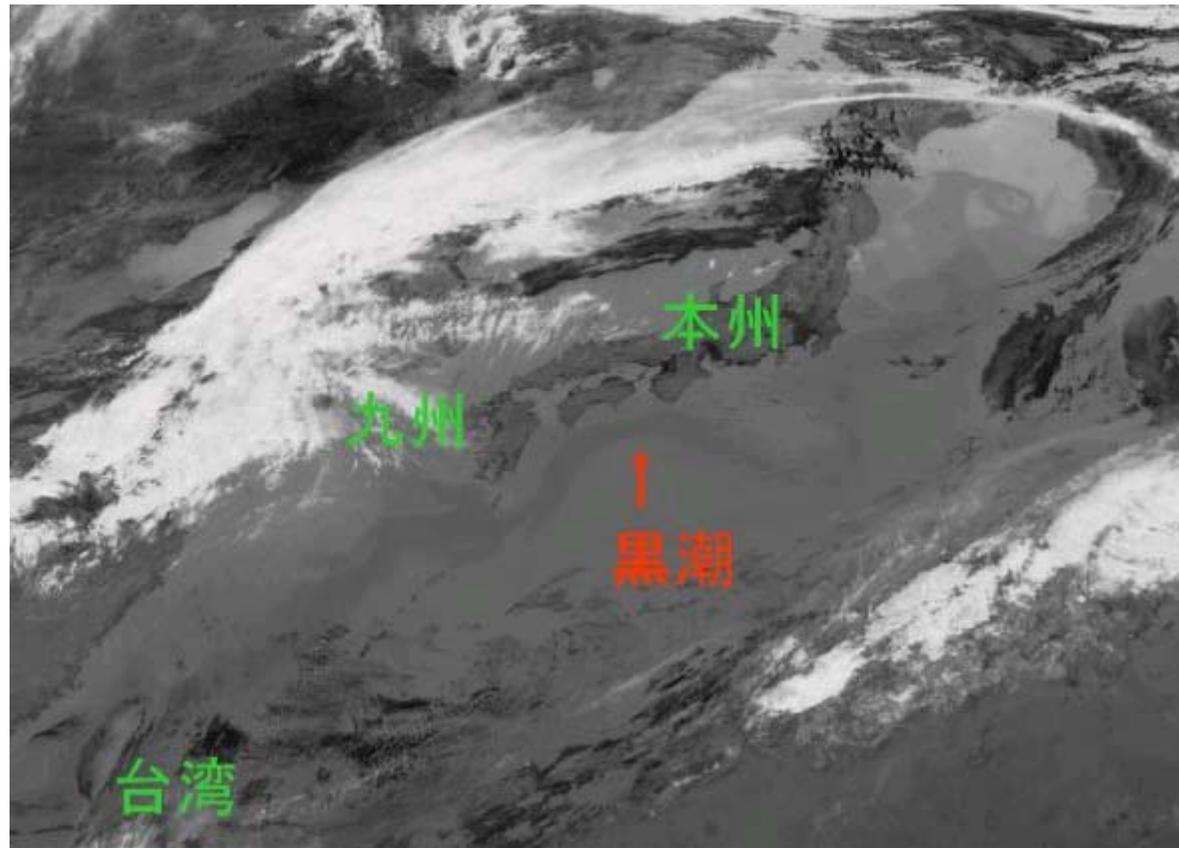
4-1. The airplane reconnaissance of sea-ice over the Sea of Okhotsk, etc.



A photograph of sea-ice over the Sea of Okhotsk taken from the P3-C aircraft (whose shadow is seen in)

(5) Studies on the meander of the warm current around the coastal area

5-1. The analysis of the "Kuroshio" based on satellite data, etc.



Meander of the Kuroshio seen in the near-infrared image of MTSAT-1R