

Plate Boundary Models in and around Japan

Takaya IWASAKI

Earthquake Research Institute, the University of Tokyo

iwasaki@eru.u-tokyo.ac.jp

A. Download site : http://evrrss.eri.u-tokyo.ac.jp/database/PLATEmodel/PLMDL_2016/

This site is composed of the following directories.

/Trench

/PAC_Plate

/Base model

xyz file (ascii)

grid file

/contour

contour line files (ascii)

/Regional model

xyz file (ascii)

grid file

/contour

contour line data (ascii)

/PHS Plate

/Base model

xyz file (ascii)

grid file

/contour

contour line data (ascii)

/Regional model

xyz file (ascii)

grid file

/contour

contour line data (ascii)

B. Model region : 12°-54° N and 118°-164° E (Fig.1).

C. Trench axis data :

Explanations

Trench axis data are composed of longitude, latitude (degree) and water depth (m).

This data, originally obtained from bathymetry data, were smoothed by spline interpolation (Fig.1)

Directory: **/Trench**

Files

japan_trench_pos: Kuril-Japan-Izu-Bonin-Mariana trench

nankai_trough_pos: Sagami-Suruga-Nankai trough-Ryukyu trench

manila: Manila trench

philippine: Philippine trench

ryukyu_taiwan: tectonic boundary from the southernmost ryukyu trench to Taiwan

manila_philippine: tectonic boundary connecting southernmost Manila trench to the northernmost Philippine trench.

D. Plate surface data

Explanation

(1) Models for Pacific (PAC) plate and Philippine Sea (PHS) plate were prepared.
(Figs.2 and 3).

(2) Base model

Plate surfaces are determined from earthquake distribution (the Wadati-Benioff zones).

(3) Regional model

Base models around Japan were corrected using results from seismic profiling, seismic tomography and natural earthquake observation.

(4) Each model provides plate surface positions (longitude, latitude (degree) and depth (km)) with 0.025° grid size. Depth values are taken negative below the sea level.

(5) Grid data in areas where reliable plate surface is not defined are eliminated
(for example, PHS plate surface in the Kanto and Chugoku areas).

(6) Both the ascii (~.xyz) and binary (~.grd) data are prepared.

- (7) For each plate model, positions of equi-depth line (contour line) are prepared in ascii format (directory: contour). Users can define their own plate model (subducted part) from these data and trench axis data using an appropriate interpolation technique.

Directory: **/PAC_Plate** (Pacific plate model)

Base model

directory **/base_model**

files

pac_2017_3a.xyz

pac_2017_3a.grd

contour line data

directory **/contour**

files: pac1_cntr_10.bs ~ pac1_cntr_650.bs

Regional model

directory **/regional_model**

files

pac_2017_4a.xyz

pac_2017_4a.grd

contour line data

directory **/contour**

files: pac1_cntr_10.rg ~ pac1_cntr_650.rg

Directory: **/PHS_Plate** (Philippine Sea plate model)

Base model

directory **/base_model**

files

phs_2015_4a_r_2017xyz

phs_2015_4a_r_2017.grd

contour line data

directory **/contour**

files: phs1_cntt_10.bs ~ phs1_cntt_300.bs

Regional model
directory **/regional_model**
files
phs_2015_5a_r_2017.xyz
phs_2015_5a_r_2017.grd

contour line data
directory **/contour**
files: phs1_cntt_10.rg ~ phs1_cntt_300.rg

E. Topography/Bathymetry data used in our plate models

In constructing our plate model, we used the topography and bathymetry data provided from the following institutes.

- (1) Geospatial Information Authority of Japan (250-m digital map)
(permission No. H29-JoShi-17) .
- (2) Japan Oceanographic Data Center (500m mesh bathymetry data, J-EGG500,,
http://www.jodc.go.jp/jodcweb/JDOSS/infoJEGG_j.html).
- (3) Geographic Information Network of Alaska, University of Alaska (Global
Topo/Bathymetry Grid (Lindquist, et al., 2004, see also ‘F’)).

F. How to refer these plate models

- (1) If users present/publish their own results, please refer the following references.

Iwasaki, T., Sato, H., Shinohara, M., Ishiyama, T. & Hashima, A., 2015. Fundamental structure model of island arcs and subducted plates in and around Japan, 2015 Fall Meeting, American Geophysical Union, San Francisco, Dec. 14-18, T31B-2878.

Lindquist, K. G., K. Engle, D. Stahlke, and E. Price (2004), Global Topography and Bathymetry Grid Improves Research Efforts, Eos Trans. AGU, 85(19), 186.
<http://onlinelibrary.wiley.com/doi/10.1029/2004EO190003/abstract>

- (2) In “Acknowledgement” in users’ presentation/paper, add the following description to make clear the institutes which provided topography/bathymetry data).

The plate models by Iwasaki et al. (2015) were constructed from topography and bathymetry data

by Geospatial Information Authority of Japan (250-m digital map), Japan Oceanographic Data Center (500m mesh bathymetry data, J-EGG500,,
http://www.jodc.go.jp/jodcweb/JDOSS/infoJEGG_j.html) and Geographic Information Network of Alaska, University of Alaska (Lindquist et al., 2004).

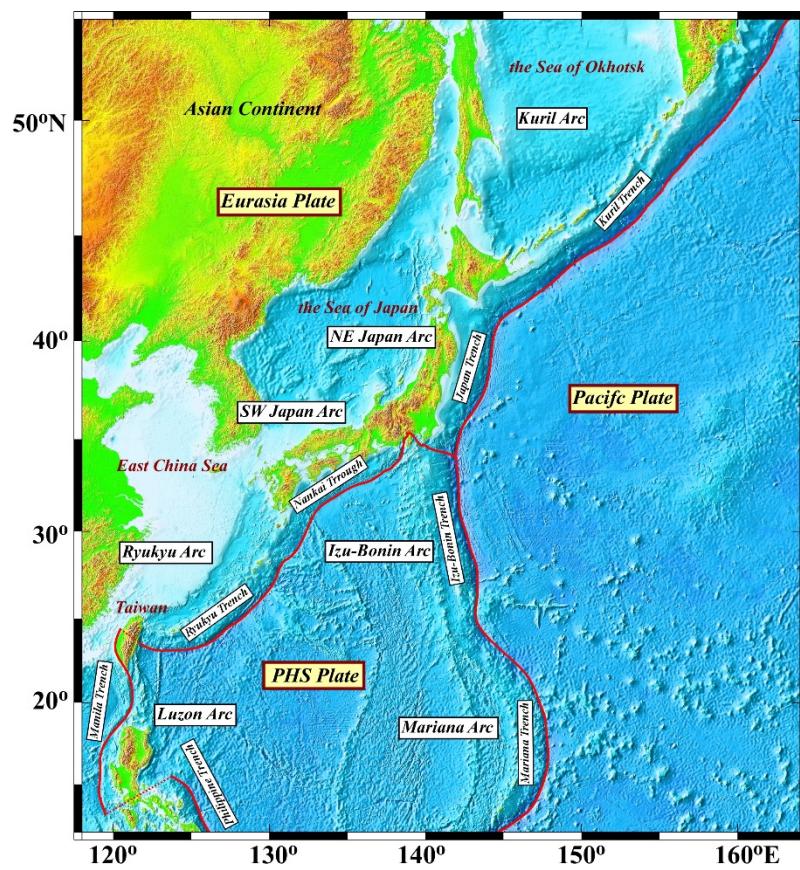


Fig.1. Topography and trench-axis models.

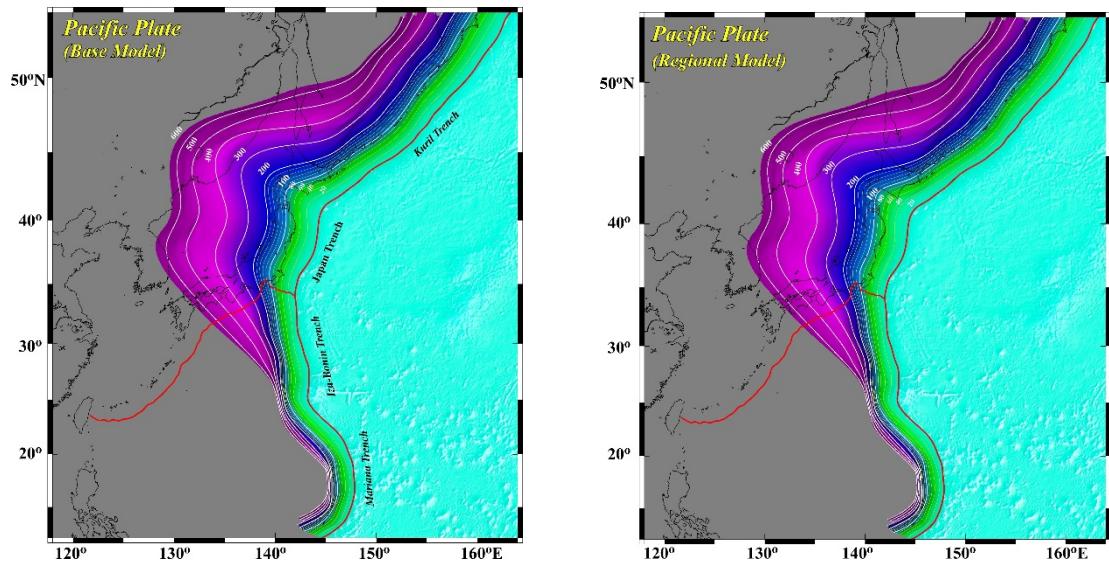


Fig.2 Base model and regional model for the PAC plate.

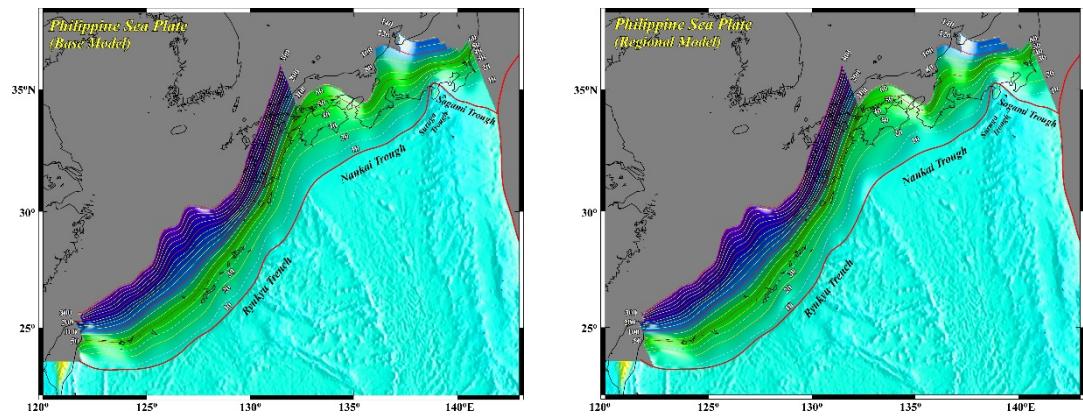


Fig.3 Base model and regional model for the PHS plate.