

PROPOSAL



International Association of Seismology
and Physics of the Earth's Interior



Commission on Seismological Observation and Interpretation Working Group

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Title: COSOI Working Group to Update and Standardise Earthquake Default Depths

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Background:

The aim of earthquake location computation is to obtain all four parameters free, but often this is not possible. The most uncertain parameter is depth. If a free depth cannot be achieved, agencies may attempt to obtain a depth derived from depth phases if available, or assign a default depth.

Currently, seismic data centres around the world assign depths of 10, 33, or multiples of 50 km, however, these depths are not always appropriate. By assigning a more geophysically meaningful default depth to a seismic region the seismological community will achieve an increased consistency of earthquake locations, allowing for better positions and magnitude estimates. Additionally, more geophysically meaningful depths will be of great benefit for earthquake early warning as it will provide a more accurate assessment of the earthquake.

The objective for this project is to produce a global set of default depths based on a typical depth for each area. For this, depths will be chosen based on well-constrained events in the Bulletin of the International Seismological Centre (ISC). For areas where this is not possible, depths will be assigned to half the thickness of the crust based on a global crustal model.

A preliminary study completed in 2005 computed proposed default depths assigned for Flinn-Engdahl geographic regions. Results from this preliminary study are published in Bolton, et al. (2006) and on the ISC website: (<http://www.isc.ac.uk/doc/analysis/2006p01/index.html>). The next step for this project is to improve the resolution of seismic regions to compute more accurate default depths.

Objectives:

1. Obtain updated default depths globally to be implemented within location procedures at regional and international data centres.
2. Standardise updated default depths and encourage these to be used globally.

Final Product:

The goal of this working group is to achieve a database of default depths to be implemented as a part of routine earthquake location procedures globally at local, regional, and international data centres.

Estimated Date of Completion: IASPEI General Assembly, 2009

Vision for Implementation:

An international working group will be formed under the IASPEI Commission on Seismological Observation and Interpretation (COSOI) to facilitate the process of updating earthquake default depths. The working group will be composed of representatives from selected regions. These members will serve as the lead for the countries in their assigned region. Once new default depths are calculated each working group member must confirm these values with local agencies within their regional subgroup.

The first task of the working group is to agree upon a method of regionalising the globe to carry out calculations. Two suggested options are: (1) a small-scale (1 km) grid or (2) a specific regionalisation scheme.

Once this has been decided, the methods used for preliminary calculations (Bolton, et al, 2006) will be used to compute new default depths.

Proposed updated default depths will be shared with working group members and confirmed with local agencies prior to being implemented as a part of the standard location procedure at regional and international data centres (eg. ISC, NEIC, IDC, EMSC, CASC, MOS, BJI).

Working group members will be advised to encourage implementation of new default depth values within location procedures at local agencies within their regional subgroup.

Reference:

Bolton, M.K., D.A. Storchak, and J. Harris. 2006. Updating default depths in the ISC bulletin. *Physics of the Earth and Planetary Interiors*, **158**, p.27-45.