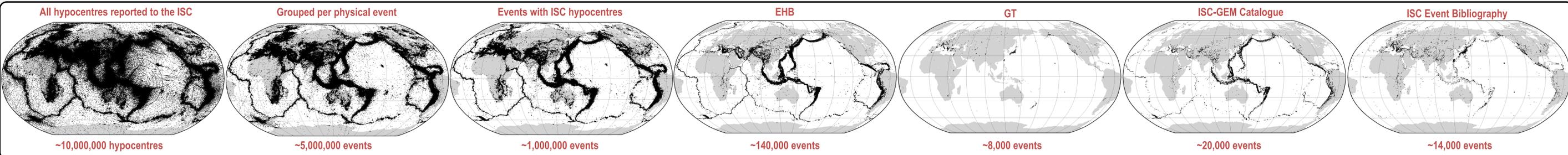


# Datasets for Seismology: ISC, EHB and GT Bulletins, ISC-GEM Catalogue and ISC Event Bibliography

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### ISC Bulletin, 1964-2014

- based on regular seismic bulletin reports from ~130 seismic agencies worldwide;
- the definitive and the most complete long-term record of global earthquake information;
- contains major source parameters of over 5 million seismic events
- natural and anthropogenic events included
- contains parameters of arrivals of seismic waves at seismic stations around the world
- station parameters are held in the International Seismographic Station Registry that the ISC is maintaining together with NEIC/USGS

[www.isc.ac.uk/iscbulletin/](http://www.isc.ac.uk/iscbulletin/)

The ISC Bulletin contains arrival times of many different types of seismic waves, including those predicted by the ak135 velocity model.

The ISC Bulletin is more complete as compared to the bulletin of NEIC or any other agency.

### ISC-GEM Catalogue, 1900-2009

- created by the ISC and the group of international experts on request of the GEM Foundation;
- built to satisfy the requirements of global seismic risk and hazard analysis;
- the most homogeneous and consistent list of large earthquakes worldwide based on the instrumental recordings over 110 year period (Storchak et al., 2013).

[www.isc.ac.uk/iscgem/](http://www.isc.ac.uk/iscgem/)

The work on the ISC-GEM Catalogue required compilation and digitising of a large volume of data that has not been available electronically in the past.

Global Parametric Data	1900-1959	1960-1977	1978-2009
Body wave arrival times amplitudes & periods	Became electronically available thanks to the ISC-GEM catalogue	Already available as part of the ISC & GCMT	Already available as part of the ISC & GCMT
Surface wave amplitudes & periods	available thanks to the ISC-GEM catalogue	Already available as part of the ISC & GCMT	Already available as part of the ISC & GCMT
Mo & Mw	ISC-GEM catalogue	ISC-GEM catalogue	ISC-GEM catalogue

Geographical distribution of those seismic stations that contributed seismic wave arrival times (top), amplitudes and periods of body waves (middle) and surface waves (bottom). Grey colour shows stations that contributed for an overall period of 20 years or less, black – between 20 and 40 years, red – more than 40 years.

### ISC Event Bibliography, 1904-2014

- Links seismic events in the ISC Bulletin with scientific articles related to those events;
- Allows interactive user web-search for references to articles devoted to events in a particular region and period of occurrence/publication;
- ~16,000 articles, ~14,000 seismic events and ~500 journal titles (Di Giacomo et al., 2014);
- seismic events cover: 1904 – present; publications cover: 1950 – present;
- includes articles in many fields of Geosciences;

[www.isc.ac.uk/event\\_bibliography/](http://www.isc.ac.uk/event_bibliography/)

Where possible, earthquake magnitudes are expressed in  $M_w$  scale based on seismic moment from GCMT and our own bibliographical search of individual earthquake studies. Proxy  $M_w$  are estimated in all other cases based on the newly developed empirical relationship with re-computed  $M_s$  and mb.

Every earthquake hypocentre (1904-2009) has been re-computed using the ak135 velocity model (Kennet et al., 1995) and a combination of the EHB and new ISC location procedures (Bondár & Storchak, 2011).

The following magnitude cut-off thresholds have been set before the first stage of the project:

- 1900-1917:  $M_s \geq 7.5$  worldwide complemented by a few tens of smaller shallow earthquakes in stable continental areas;
- 1918-1959:  $M_s \geq 6.4$ ;
- 1960-2009:  $M_s \geq 5.5$ .

Comparison of the annual number of earthquakes during the early instrumental period in the current version of the ISC-GEM Catalogue, the BAAS/ISS bulletins (1913-1960) and the Centennial Catalog (1904-1912) (Engdahl and Villaseñor, 2002). The horizontal bars indicate the expected average annual number of earthquakes above the current magnitude cut-off thresholds, based on earthquake numbers in modern instrumental period. The black arrows signify our current effort to extend the ISC-GEM catalogue by complementing it with earthquakes of smaller magnitudes before 1960.

### EHB bulletin, 1960-2008

- groomed subset of the ISC Bulletin enhanced with the data of temporary deployments Engdahl et al. (1998)
- benefits from dynamic phase identification, use of first arriving P, S and PKP and teleseismic depth phases pP, pwP and sP (with PDFs and bounce point corrections), empirical teleseismic station patch corrections;
- often used in seismic tomography
- contains source parameters and arrival times from over 140 thousands well recorded seismic events (no magnitude re-computations made)

[www.isc.ac.uk/ehbulletin/](http://www.isc.ac.uk/ehbulletin/)

The EHB bulletin contains arrival times of the most prominent and well reported types of seismic waves predicted by the ak135 velocity model.

The EHB bulletin is a groomed selection of well-recorded events from the ISC Bulletin.

### Summary

- The ISC continues with its unique international mission and produces an important set of products:
  - the ISC, EHB and GT bulletins;
  - the ISC-GEM Global Instrumental Earthquake Catalogue;
  - the ISC Event Bibliography.
- These products are widely used for seismic hazard assessment, studies of the Earth's structure, monitoring compliance with CTBT and in many other fields of Earth Science research.
- Thanks to the support of its Members, the ISC is able to create, maintain, extend and distribute these products free to all users.

### GT bulletin, 1959-2012

- The IASPEI Reference Event List, commonly known as the GT- ground truth bulletin) is a database of earthquakes and explosions, for which:
  - hypocentral information (lat, lon, depth) is known with high confidence (to 10 km or better (GT10)) and
  - seismic signals recorded at regional and/or teleseismic distances.
- The bulletin is maintained by the ISC under the supervision of IASPEI/CoSOI
- currently contains 7871 events with corresponding seismic station arrivals

[www.isc.ac.uk/gtevents/](http://www.isc.ac.uk/gtevents/)

GT Bulletin (Depth <= 20; 7320 events)  
59 ak135 phases, 62910 residuals  
1959-12-31 to 2012-09-12

GT0(664) • GT1(371) • GT2(123) • GT5(6713)

natural(6581) • chemical(261) • nuclear(1029)

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For details, see poster #34