



The unique contribution of the IDC Reviewed Event Bulletin to global seismicity catalogues

Karl Koch (1) and Fekadu Kebede (2)

(1) Federal Institute for Geosciences & Natural Resources, Hannover, Germany (karl.koch@bgr.de), (2) CTBTO Prepcom, PTS/IDC, Vienna, Austria

For monitoring the Comprehensive Nuclear-Test-Ban Treaty (CTBT) the International Monitoring System (IMS) network is currently being established that will eventually consist of 241 seismic, hydroacoustic and infrasound stations. The final result of processing and analysis of seismological and other waveform technology data from these stations is the Reviewed Event Bulletin (REB), which has been issued by the International Data Center (IDC) under provisional operation since February 2000 on a daily basis, except for a total of 28 days. The nearly 300,000 events produced since then correspond to more than 25,000 events per year. As an accompanying effort to the bulletin production at the IDC, quality assurance work has been carried out for the REB for the years from 2000 to 2008 through comparisons to similar bulletins of global seismicity, issued by the ISC and the National Earthquake Information Center (NEIC) of the United States Geological Survey. The comparisons with the NEIC bulletin concentrate on a timely identification of larger events that were either missed during interactive analysis at the IDC or which have been significantly mislocated. For the scope of this study the comparisons with the ISC bulletin are the focus, as this bulletin provides the most complete reference to global seismicity, even though it becomes available only after about two years of event occurrence. In our quality assessments we aimed at evaluating the consistency of event locations for common events, i.e. found in both the REB and the ISC bulletin having been relocated by ISC; the degree and the geospatial location of the events only produced in the REB and verified not being bogus, and those ISC relocated events not contained in the REB and which were missed during IDC analysis.

Even though the seismic component of the IMS network with its maximum 170 seismometer stations is a sparse teleseismic network, locations differences of less than 1° (0.5°) are observed, on average, for about 94% (85%) of the common events, as obtained from the ISC bulletin comparisons for the years 2000 to 2006. On the other hand, only 0.25% of such events were located more than 5° apart by the IDC and the ISC. The number of events of significant magnitude missed by the IDC is small and related predominantly to lack of sufficient number of observed arrivals to define an event.

The unique contribution of the REB to global seismicity catalogues is expressed by the significant number of REB events that are solely reported in the ISC bulletin. Over the most recent years 2004-2006 the REB and ISC bulletin include about 20,000 common events which were reprocessed by the ISC. This compares to a steadily rising number of solely contributed REB events from more than 5,000 events in 2004 to nearly 7,500 events in 2006, i.e. a quarter to a third events more. These unique IDC events are mainly in remote and oceanic areas. A more important aspect, however, is the number of unique IDC events at depth. Below a depth of about 300 km there are nearly any ISC events not detected by the IMS network, while the number of events at larger depths and only detected by the IMS is significant. As conclusion it is found that the IDC REB is a valuable source for studies of deep seismicity occurring within the global subduction zones.