

-associated Surface Waves Within the Automated Processing Flow of the Reviewed Event Bulletin

Wednesday, 21 June 2023 09:01 (1 minute)

When monitoring for potential underground nuclear tests, distinguishing shallow earthquakes from explosive sources can often be achieved using the ratio of the body-wave magnitude to the surface-wave magnitude (mb:Ms), as explosive sources often produce less energetic surface wave excitations than earthquakes with the same mb. Current methods for surface-wave detection at the International Data Centre (IDC) rely on a dispersion test. A global group-speed model is used to predict a time window based on origins in the IDC Reviewed Event Bulletin (REB). The waveforms in the predicted time window are filtered into eight frequency bands - if the time of the maximum energy of at least six of these bands sits within a specified error of the expected dispersion curves, a surface wave is detected. The current version of this algorithm was implemented into provisional operations at the IDC in 2010 (Maxpmf). We have designed interactive software to review the IDC automatic surface-wave detection algorithm. We investigate mis-associated surface wave arrivals in the REB, caused by a processing limit of surface wave detection to 100 degrees distance. Examples of surface waves originating from greater than 100 degrees distance and being associated with a closer event are presented.

E-mail

jcondon@blacknest.gov.uk

Promotional text

Removing mis-associated surface waves and verifying the surface wave network averaged magnitude values in the REB, improves the reliability of the mb:Ms screening criteria, allowing for greater confidence in event characterisation.

Oral preference format

in-person

Primary author: Mr CONDON, John (Atomic Weapons Establishment (AWE) Blacknest)

Co-author: SELBY, Neil (Atomic Weapons Establishment (AWE) Blacknest)

Presenter: Mr CONDON, John (Atomic Weapons Establishment (AWE) Blacknest)

Session Classification: Lightning talks: P2.1, P2.3, P4.4

Track Classification: Theme 2. Events and Nuclear Test Sites: T2.1 Characterization of Treaty-Relevant Events