

## **Investigating Alternative Location Methods at the ISC**

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A poster in Tuesday morning session S21D, [Earthquake Location: Applications and Developments of New Techniques 1 Posters](#)

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The International Seismological Centre is replacing the software it uses to calculate hypocentres, which it does using arrival times from all over the world. The new program will initially use the same algorithms as now but can also be used to test ways of improving solutions using modern methods. Here, we investigate using travel times from three dimensional earth models instead of from the Jeffreys-Bullen tables currently used. Travel times were calculated for every combination of station and source area using velocity models and ray tracing and the resulting source specific station times were stored and used in tables. Travel times for regional phases (delta less than 16 degrees) were calculated using a model for the upper mantle developed at the University of Colorado (Ritzwoller et al. 2002). Travel times for teleseismic phases (delta greater than 20 degrees) were calculated using a mantle model developed at Harvard University (Antolik et al. 2003). As a test we calculated residuals for arrivals in the ISC bulletin for large nuclear explosions in Nevada and Kazhakstan. In general, the new travel time tables reduced residuals with respect to these known source times and locations and when we tried free solutions for these events the results were closer to the truth than when using existing ISC methods. Although initial indications are that solutions would improve using these methods the ISC would face many challenges if it were to adopt them for routine hypocentre computation. From a scientific perspective the models may lack sufficient resolution in regions without many earthquakes or local stations. From a technical perspective station specific tables become awkwardly large when calculated for many hundreds of stations at several depths and for various phases.

Poster in PDF format [part 1](#) and [part 2](#)