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Arrivals in the International Data Centre Bulletins: Reviewing 14 Years of Results and Celerity-Range Model Changes

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Following recent analysis of infrasound signals generated by the 2018-Dec-18 Bering Sea bolide, it became apparent that the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO), International Data Centre (IDC), Reviewed Event Bulletin (REB) observed celerity for the closest station (~1200 km distance) was outside the bounds of the Brachet et al. (2010) model. Using the signal arrival time, event origin time and the time residual, the model celerity is calculated as ~310 m/s, rather than the Brachet et al., (2010) model celerity of 295 m/s at this distance. Analysis of the model celerity through time (2010-2024) of all detections associated with infrasound-only and seismo-acoustic events in the IDC bulletins, identifies celerity model changes in May-2017 and again in August-2020, coinciding with the deployment of major software updates at the IDC. In this study we investigate the impact of these celerity model changes on detection distributions and event locations.

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