

Acoustic Gravity Waves Triggered by the 22 July 2009 Total Solar Eclipse

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It has been predicted that the Moon shadow, the cooling region, sweeping over the atmosphere with a supersonic speed could trigger bow waves since 1970. The longest total solar eclipse within next hundred years occurring on 22 July 2009 sweeps over the Eastern Asia region during the noontime period. Frequency-amplitude analyses are applied to study ionospheric TEC (total electron content) derived from ground-based GPS receivers in Taiwan and Japan. We not only find the feature of the predicted bow wave but also the stern wave on the equator side of the eclipse path, as well as the stern wake right behind the Moon shadow boat. The bow and stern waves are formed by acoustic gravity waves of periods about 3 and/or 5 minutes traveling equatorward with a phase speed of about 100s m/s in the ionosphere.

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