M43a Dynamic Process of the Moreton wave on 2014 March 29

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Shock waves associated with explosive events are fundamental physical processes in solar and stellar plasmas, whose properties and effects have widely been discussed in the framework of MHD theory. In the Sun's chromosphere a wavelike propagating disturbance, known as Moreton wave, occasionally happens in association with strong flares and coronal mass ejections. In this work we present a study of a Moreton wave that accompanied an X-class flare on 2014 March 29. This event was successfully detected in multiwavelength imaging in Hα line by the Flare Monitoring Telescope (FMT) in operation at Ica National University, Peru. We made use of FMT wing (Hα $\pm$0.8 Å) observations to investigate the dynamics of the Moreton wave. The Doppler analysis reveals a downward motion of the chromospheric material with a velocity of about 6 km s^{-1}, at the front of the Moreton wave. On the other hand, the estimated surface velocity of the Moreton wave ranges between $640-859$ km s^{-1}. We also performed the temperature-emission measure analysis on this event, based on EUV data taken by the SDO/AIA. Considering these results and with the aid of the MHD linear theory, we discuss the characteristics of the shock front, such as the compression ratio and the Alfvén and the fast-mode Mach numbers. We also discuss the interaction of the shock front with the chromospheric plasma.