



Contribution ID: 26

Type: **not specified**

Hot X-ray Onsets of Solar Flares

Thursday, 8 July 2021 17:40 (50 minutes)

The study of the localized plasma conditions before the impulsive phase of a solar flare can help us understand the physical processes that occur leading up to the main flare energy release. Here, we present evidence of a hot X-ray 'onset' interval of enhanced isothermal plasma temperatures in the range of 10-15 MK up to tens of seconds prior to the flare's impulsive phase. This 'hot onset' interval occurs during the pre-flare time during which elevated soft X-ray flux is detected, but prior to detectable hard X-ray emission. The isothermal temperatures, estimated by the Geostationary Operational Environmental Satellite (GOES) X-ray sensor, and confirmed with data from RHESSI, show no signs of gradual increase and occurs regardless of flare classification or configuration. In a small sample of four representative flare events, we identify this early hot onset soft X-ray emission mainly within footpoint and low-lying loops, rather than with coronal structures, based on images from the Atmospheric Imaging Assembly (AIA) and the use of limb occultation. These hot X-ray onsets appear before there is evidence of collisional heating by non-thermal electrons, and hence challenges the standard flare heating modelling techniques.

Email

paulo@craam.mackenzie.br

Primary author: SIMÕES, Paulo (CRAAM/Mackenzie)

Co-authors: HUDSON, Hugh (UC Berkeley and University of Glasgow); FLETCHER, Lyndsay (University of Glasgow); Dr HAYES, Laura (Dublin Institute of Advanced Studies (DIAS) /Trinity College Dublin, Dublin, Ireland); HANNAH, Iain

Presenter: SIMÕES, Paulo (CRAAM/Mackenzie)

Session Classification: Working Group 1: Flare thermal response

Track Classification: Working Group 1: Flare thermal response