Stellar Flares and Habitable (?) Worlds from the TESS Primary Mission

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Image Credit: NASA/GSFC/SDO

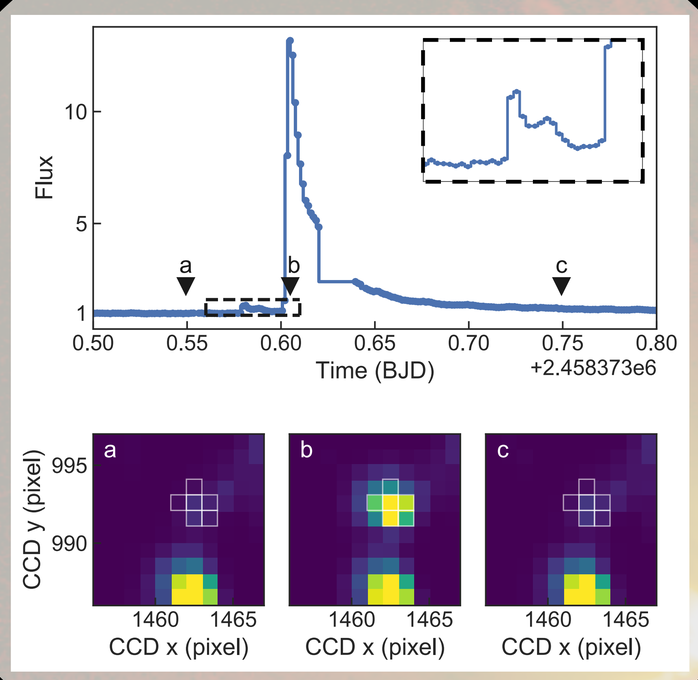

Fig. 1

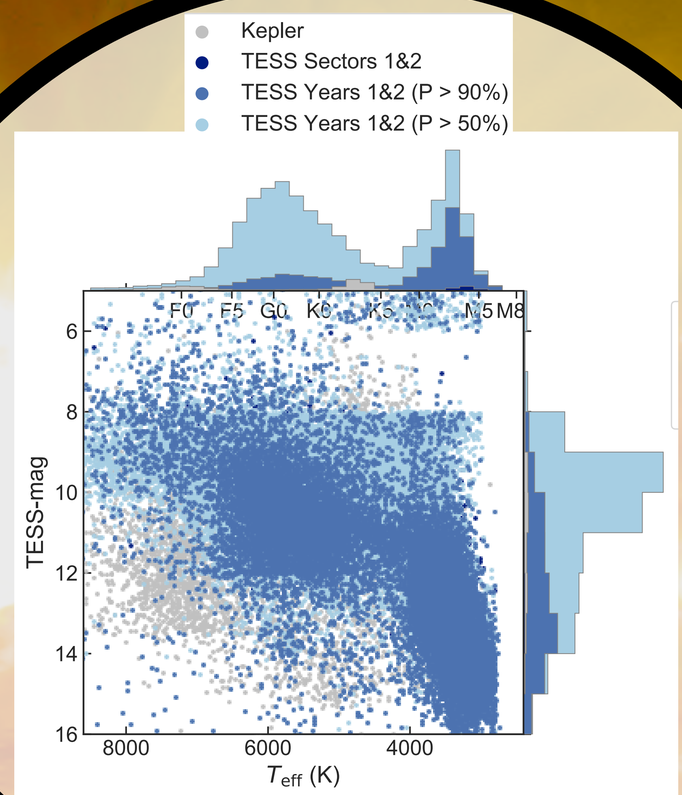

Fig. 2

Stellar flares might be necessary to **trigger the origin of life** on M-dwarf worlds, but they can also **diminish exoplanet atmospheres** and end surface life.

We link TESS observations to atmosphere and prebiotic chemistry studies, so we can find out which stars show **the right amount of flaring for habitability**.

See https://www.youtube.com/watch?v=Cy5ZhI7Qd0g for my 5 min talk at the recent Habitable Worlds conference :)

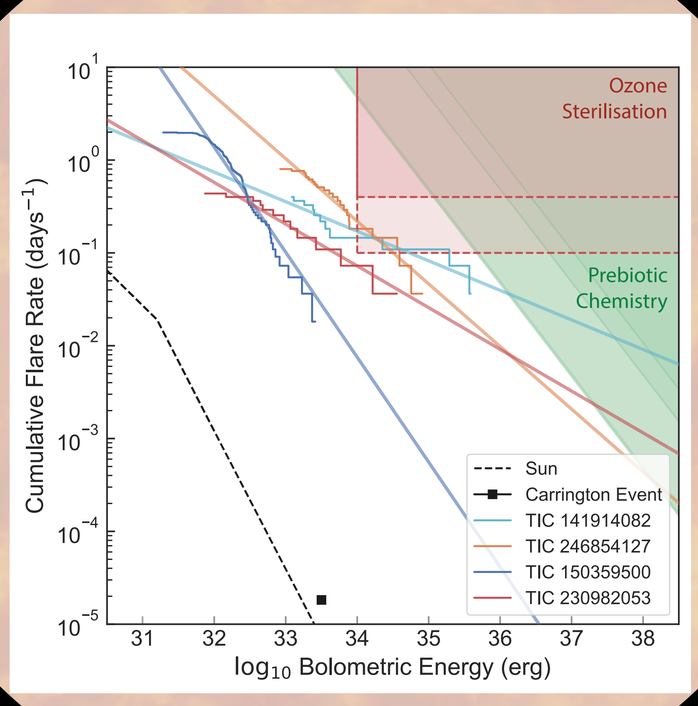

Fig. 3

Fig. 1: *We studied flares on over 200,000 stars observed with 2 min. cadence in TESS Years 1 & 2. One of the largest flare in this sample increased the brightness by a factor of 16.*

Fig. 2: *The effective temperature versus TESS magnitude of flaring stars in the TESS sample (blue) and the Kepler flare catalog (grey; Davenport 2016). TESS is designed to explore bright early to late M-dwarfs, strongly expanding this sample for flare studies.*

Fig. 3: *Flare frequency vs. energy distribution for rapidly rotating early M-dwarfs observed by TESS. Red circles show the flares for all stars, with red lines showing a linear interpolation for each star. Red area: Ozone sterilisation through charged particles that accompany the flaring (Tilley et al. 2019). Green area: Stellar flares deliver enough UV energy to potentially produce precursors for prebiotic chemistry (Rimmer et al. 2018).*

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