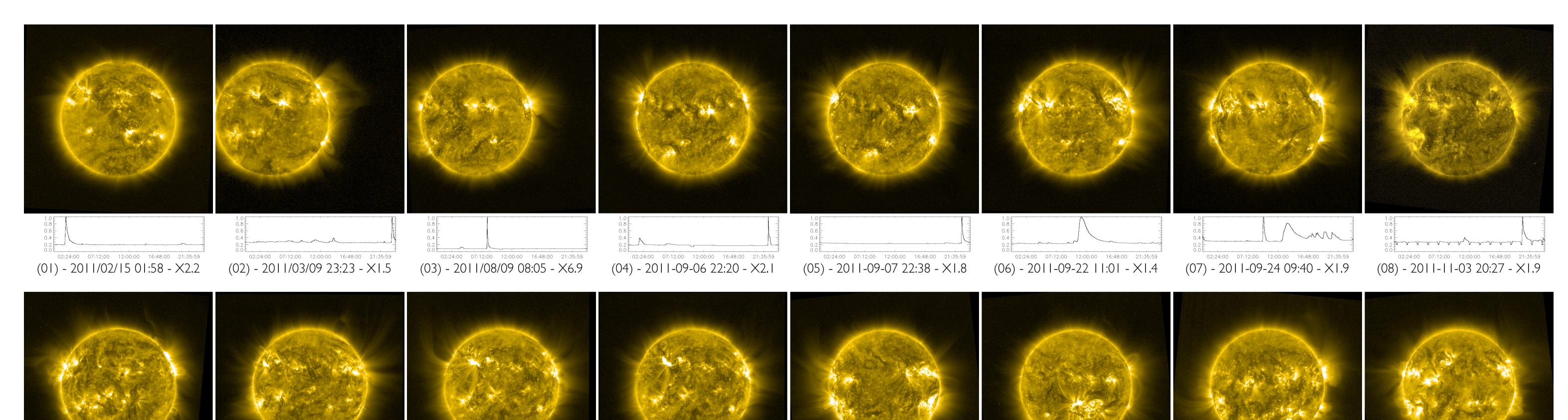
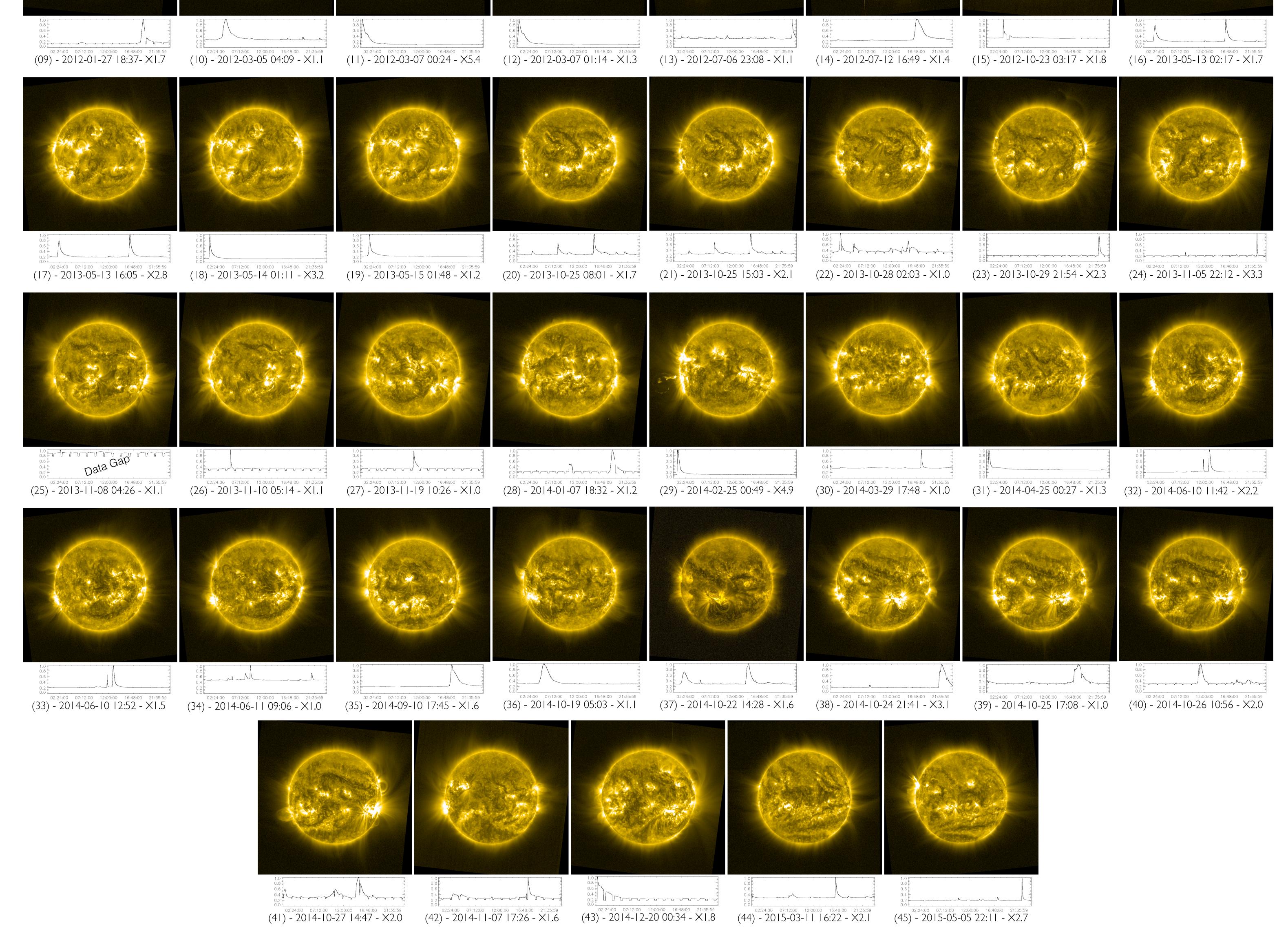
THE 45 X-CLASS FLARES OBSERVED BY PROBA2





A solar flare is a sudden, rapid, and intense variation in localised brightness seen on the Sun. Flares occur when magnetic energy that has built up in the solar atmosphere is suddenly released, and radiation is emitted across the electromagnetic spectrum. Flares are classified according to their X-ray brightness with a letter: A ($I < 10^{-7}$ W/m²), B ($10^{-7} \ge I < 10^{-8}$ W/m²), C ($10^{-6} \ge I < 10^{-5}$ W/m²), M ($10^{-5} \ge I < 10^{-4}$ W/m²), and X ($I \ge 10^{-4}$ W/m²). Each category has nine subdivisions (based on a logarithmic scale) ranging from, e.g., CI to C9, MI to M9, except X which carries on increasing. So an X2 flare is twice as powerful as an XI flare. The largest flare recorded in the modern era is an X28 flare (28×10^{-4} W/m²). The number of flares varies with the solar activity cycle, with more flares seen during solar maximum and less at solar minimum.

PROBA2 is a small ESA satellite operated from the Royal Observatory of Belgium, with a scientific mission to explore the active Sun and monitor solar activity. PROBA2 has two solar monitoring instruments: SWAP (an EUV imager) and LYRA (an irradiance monitor). It has been watching the Sun since November 2010—near the start of the current solar cycle—and has recorded numerous flares. The series of images above show all the X-class (most powerful) flares seen in the current solar cycle as recorded by SWAP (top) and LYRA (bottom). Each SWAP image shows the Sun at the time of the flare, and the corresponding LYRA (Aluminium channel) curve shows the normalised irradiance throughout the day.





