Gamma Ray Bursts are sometimes preceded by dimmer emission episodes, called "precursors", whose nature is still a puzzle. Theoretical models predicted a thermal spectrum, generally softer than the following main prompt emission.

How to define a "precursor"? Since there is no obvious a priori criterion, we called "precursor" an initial signal which:
(1) had a smaller peak flux than the main event in the same energy band;
(2) the flux returned to the background level before the start of the main event.

We showed that precursors and main events in BATSE:
(1) span the same parameter space in the planes $E_{\text{peak}}$ vs. Flux, and $\Phi_{\text{h}}$ Index vs. Flux;
(2) seem to be consistent with the relation $\text{Flux} \sim E_{\text{peak,obs}}^2$ (Liang et al. 2004, Firmani et al. 2009);
(3) $\langle \alpha_{\text{prec}} \rangle = -1.03 \pm 0.27$ and $\langle \alpha_{\text{main}} \rangle = -0.94 \pm 0.34$ (KS null prob $10^{-2}$);
(4) $\langle \log(E_{\text{peak,prec}}) \rangle = 2.49 \pm 0.35$ and $\langle \log(E_{\text{peak,main}}) \rangle = 2.60 \pm 0.24$ (KS null prob $\sim 10^{-4}$).

Precursors do not represent any different physical process

(1) spectra are non-thermal and the photon indices are consistent and there is no difference for 3 quiescence intervals in the rest frame;
(2) the energy is huge (~30% of main event) and there is no clear dependence on quiescence.

Burlon, Ghirlanda, Ghisellini, Greiner, Celotti; 2009, A&A 505:509-575 and references therein