

# Consistency between deep crustal heating of strange stars in superbursters and soft X-ray transients

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**ABSTRACT:** Both superbursters and soft X-ray transients probe the process of deep crustal heating in compact stars. It was recently shown that the transfer of matter from crust to core in a strange star can heat the crust and ignite superbursts provided certain constraints on the strange quark matter equation of state are fulfilled. We derive corresponding constraints on the equation of state for soft X-ray transients assuming their quiescent emission is powered in the same way, and further discuss the time dependence of this heating mechanism in transient systems. We approach this using a simple parametrized model for deep crustal heating in strange stars assuming slow neutrino cooling in the core and blackbody photon emission from the surface. The constraints derived for hot frequently accreting soft X-ray transients are always consistent with those for superbursters. The colder sources are consistent for low values of the quark matter binding energy, heat conductivity and neutrino emissivity. The heating mechanism is very time dependent which may help to explain cold sources with long recurrence times. Thus deep crustal heating in strange stars can provide a consistent explanation for superbursters and soft X-ray transients.