A New Clock for the Sun: Sun-Climate Implications & What May Be Looming

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The Sun's variability is controlled by the progression and interaction of the magnetized systems that form the 22-year magnetic activity cycle as they march from their origin at ~55° latitude to the equator, over ~19 years. We will discuss the end point of that progression, dubbed "terminator" events, and our means of diagnosing them. These approximately decadal scale events *simultaneously* mark the end of magnetic cycles and are the trigger for the growth of the sunspot cycle (the butterfly pattern of sunspots) at mid-latitudes and the rush to the poles at high latitudes. We will briefly explore the consequences of such events for what we know about the Sun's interior. We will then show that these events provide a new clock to frame the Sun's activity proxies before we demonstrate how that clock translates into significant terrestrial impact that has gone unnoticed, largely because we have been using the landmarks of the sunspot cycle ("max" and "min") as our translative clock. We will show when the next terminator will happen (in 2020) and discuss the signature that it may have. Finally, developing a longer baseline for terminator events in the 270+ years of the sunspot record, we will present a look at the upcoming sunspot cycle based on currently visible indicators – the result will be of great interest to the group.