Increased extinction probability of the Madden-Julian oscillation after about 27 days

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The Madden-Julian oscillation (MJO) is a tropical weather system that has an important influence in the tropics and beyond; however, many of its characteristics are poorly understood, including their initiation and termination. Here we define Madden-Julian events as contiguous time periods with an active MJO, and we show that both the durations and the sizes of these events are well described by a double power-law distribution. Thus, small events have no characteristic scale, and the same for large events; nevertheless, both types of events are separated by a characteristic duration of about 27 days (this corresponds to half a cycle, roughly). Thus, after 27 days, there is a sharp increase in the probability that an event becomes extinct. We find that this effect is independent of the starting and ending phases of the events, which seems to point to an internal mechanism of exhaustion rather than to the effect of an external barrier. Our results would imply an important limitation of the MJO as a driver of subseasonal predictability.