Current production rate of dark splotches on the surface of Mars

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High-resolution images of Mars surface have revealed that some small-scale features are currently changing/occurring in numerous locations. Those include moving dunes, recurring slope lineae [*McEwen et al.*, 2011]), slope streaks [*Malin and Edgett*, 2001], gullies and their associated rockslides [*Malin et al.*, 2006]), and 10's to 100's meter-scale dark splotches, which are commonly interpreted as results of small impacts [*Malin et al.*, 2006]. The production rate of such splotches (or dark patches) were estimated through image analyses [*Malin et al.*, 2006; *Daubar et al.*, 2013] and from the current impact flux [*JeongAhn and Malhotra*, 2015; *Williams et al.*, 2014].
The approach of Daubar et al [2013], carefully comparing high-resolution images of the same location at different times, is the most straight-forward but requiring significant effort of humans because automatic machine comparisons of different images obtained at different illumination and calibration conditions are technically difficult. To overcome this difficulty, we perform thorough comparisons of images by using >20,000 people in a museum located at the center of Tokyo. More than 2,450 pairs of CTX images (~3.2 years apart on average), equivalent to the surface areas of ~6.2×10^6 km^2 (ATF = ~2.0×10^7 $km^2 yr$), were manually analyzed through about 15 months of the experiment. The results are also examined by 20 volunteer members of the museum, and then reanalyzed by 4 researchers. The entire team is organized by three professional scientists of Mars geology background. So far, we identify >230 newly formed splotches including five reported in [*Daubar et al.*, 2013]). We obtain the production rate of ~1.1×10^{-5} $/km^2/yr$, which is more than one order of magnitude larger than the values reported in previous image-based studies [*Malin et al.*, 2006; *Daubar et al.*, 2013] and theoretical models [*Hartmann*, 2005; *JeongAhn and Malhotra*, 2015]. In this talk, we will also report the arial difference of the production rate.

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