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## Seismic activity rate of Mars, based on 420 Sols of InSight data

**Simon C. Stähler**<sup>1</sup>, Martin Knapmeyer<sup>2</sup>, Domenico Giardini<sup>1</sup>, John Clinton<sup>3</sup>, Tom Pike<sup>4</sup>, Philippe Lognonné<sup>5</sup>, Mark Panning<sup>6</sup>, Maren Böse<sup>3</sup>, Savas Ceylan<sup>1</sup>, Constantinos Charalambous<sup>4</sup>, Martin van Driel<sup>1</sup>, Anna Horleston<sup>7</sup>, Taichi Kawamura<sup>5</sup>, Sharon Kedar<sup>6</sup>, Amir Khan<sup>1</sup>, John-Robert Scholz<sup>8</sup>, and Bruce Banerdt<sup>6</sup>

<sup>1</sup>ETH Zürich, Geophysics, Zürich, Switzerland ([simon.staehler@erdw.ethz.ch](mailto:simon.staehler@erdw.ethz.ch))

<sup>2</sup>DLR Institute of Planetary Research, Rutherfordstr. 2, 12489 Berlin, Germany

<sup>3</sup>Swiss Seismological Service (SED), ETH Zurich, Sonneggstr. 5, 8092 Zurich, Switzerland

<sup>4</sup>Department of Electrical and Electronic Engineering, Imperial College London, South Kensington Campus, London, SW7 2AZ, United Kingdom

<sup>5</sup>Université de Paris, Institut de physique du globe de Paris, CNRS, F-75005 Paris, France

<sup>6</sup>Jet Propulsion Laboratory, California Institute of Technology; 4800 Oak Grove Dr., M/S 183-301, Pasadena, CA 91109, USA

<sup>7</sup>School of Earth Sciences, University of Bristol, Wills Memorial Building, Queens Road, Bristol BS8 1RJ, UK

<sup>8</sup>Max Planck Institute for Solar System Research, Justus-von-Liebig-Weg 3, 37077 Göttingen, Germany

We present an updated estimate of the seismic activity rate of Mars after seven months of high-quality recording of the InSight SEIS instrument. The instrument has been deployed fully on Sol 60 (February 2, 2019) and has been recording with excellent performance since then. The first distant marsquake was observed on Sol 105 (March 14), the first local event on Sol 128 (April 7). From then until early January 2020 (Sol 400), 23 likely events and another 13 candidate events have been observed. Due to a strong diurnal variation in background noise and the generally low magnitude of the activity (compared to Earth), events have been observed only in few low-noise periods of the day. The change of seasons varied the duration of these low-noise periods over the mission, with a magnitude and time-dependent effect on detectability of events and the quantitative estimation of event rates and moment release.

We present a statistical analysis of the global seismic activity level based on a preliminary seismic magnitude model, weighted by the temporal evolution of the ambient noise over half a Martian year. The resulting number of events smaller magnitude 3 is roughly consistent with the pre-mission estimate of Golombek (1992) and the medium model of Knapmeyer et al. (2006), however, as of now, there is a statistically significant lack of events above magnitude 3.5. This hints at a distribution that is skewed towards smaller events, compared to terrestrial global averages.