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Magnetic Storms at Mars and Earth

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In analogy with magnetic storms at the Earth, periods of significantly enhanced global magnetic activity also exist at Mars. The extensive database of magnetic measurements from Mars Global Surveyor (MGS), covering almost an entire solar cycle, is used in combination with geomagnetic activity indices at Earth to compare the occurrence of magnetic storms at Mars and Earth. Based on superposed epochs analysis the time-development of typical magnetic storms at Mars and Earth is described. In contradiction to storms at Earth, most magnetic storms at Mars are found to be associated with heliospheric current sheet crossings, where the IMF changes polarity. While most storms at the Earth occur due to significant southward excursions of the IMF associated with CMEs, at Mars most storms seem to be associated with the density enhancement of the heliospheric current sheet. Density enhancements associated with CME's can, however, also create magnetic storms at Mars. We study the longitudinal extent of CME's in the heliosphere, by investigating storms that occur concurrently at Mars and Earth.