

## **Prolific Solar Flare Factories: Monitoring Active Region Nests with Solar Orbiter**

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Magnetic activity varies over the solar cycle and is not uniformly distributed across the Sun's surface. Areas on the Sun with recurring flux emergence are called active region nests and show structure in longitude. These nests are thought to form due to non-axisymmetries in the generation and storage of the Sun's dynamo magnetic field. The nesting of magnetic activity is also observed on other Sun-like stars, suggesting that it is a fundamental process related to dynamo magnetic fields. However, our ability to study the long-term evolution and activity of solar active region nests is limited by their visibility from Earth. With ESA's Solar Orbiter periodically observing the Sun's far-side (akin to the STEREO-AB era), active region nests can now be studied in greater detail and over timescales of several solar rotations. Joint-observations of active region nests from the current solar cycle have shown that they produce more complex active regions (Hale classifications) with a higher occurrence rate of solar flares. Nested flux emergence also reinforces self-similar magnetic field topologies in the solar corona that can be leveraged when predicting the magnetic connectivity of spacecraft. In future, short to medium-term space weather forecasting will benefit from the improved identification and monitoring of active region nests.