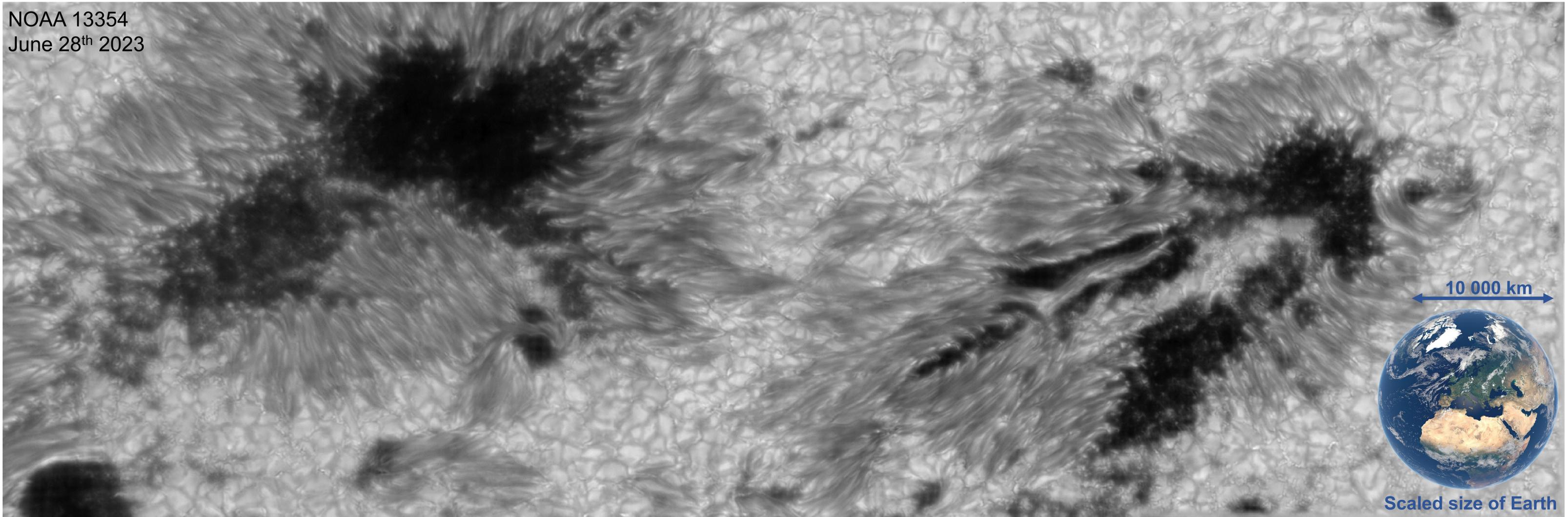


High-resolution THEMIS Observation of Solar Sunspots

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The “Télescope Héliographique pour l’Étude du Magnétisme et des Instabilités Solaires” (**THEMIS**) of **CNRS - INSU** is a 1m-class Ritchey-Chrétien **optical solar telescope**, primarily dedicated to **studying solar magnetism** and the dynamical processes within the Sun’s atmosphere, such as **sunspots** and **solar eruptions**.

THEMIS main characteristics are the followings:
Observational spectral coverage: 400-1100 nm.
Imaging field-of-view: $\sim 2' \times 2'$; square shaped.
Overall focal ratio: f/62.
Effective aperture: 92 cm.
Effective focal length: ~ 57 m.

The image correspond to a field-of-view of $\sim 150'' \times 50''$ equivalent to $\sim 109\,000 \times 36\,000 \text{ km}^2$ on the Sun. The image has been produced from three series of snapshots side by side. In each sub-image, a Knox-Thompson image reconstruction method has been used from 100 acquired snapshots. The images have been captured in the white-light red continuum ($\sim 10 \text{ nm}$ passband centered at 656 nm). The image resolution of $\sim 0.17''$, close to THEMIS diffraction limits ($\sim 0.15''$), is enabled thanks to the use of THEMIS adaptive optics.

Active regions are transient features of the Sun's atmosphere. They are a source of the violent **solar eruptions** that can affect the magnetic environment of the Earth. They are characterized by a strong and complex magnetic field. **Sunspots** are a signature of the presence of intense magnetic fields. As the most intense magnetic field concentrations inhibit the transport of energy, such regions are cooler, emit less light. They thus appears darker than the quiet solar surface. Unlike sunspot, the quiet sun regions are dominated by the **granulation** pattern. **Granules** are the convection cells in the Sun's photosphere. They are caused by currents of plasma in the Sun's convective zone, directly below the photosphere.



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