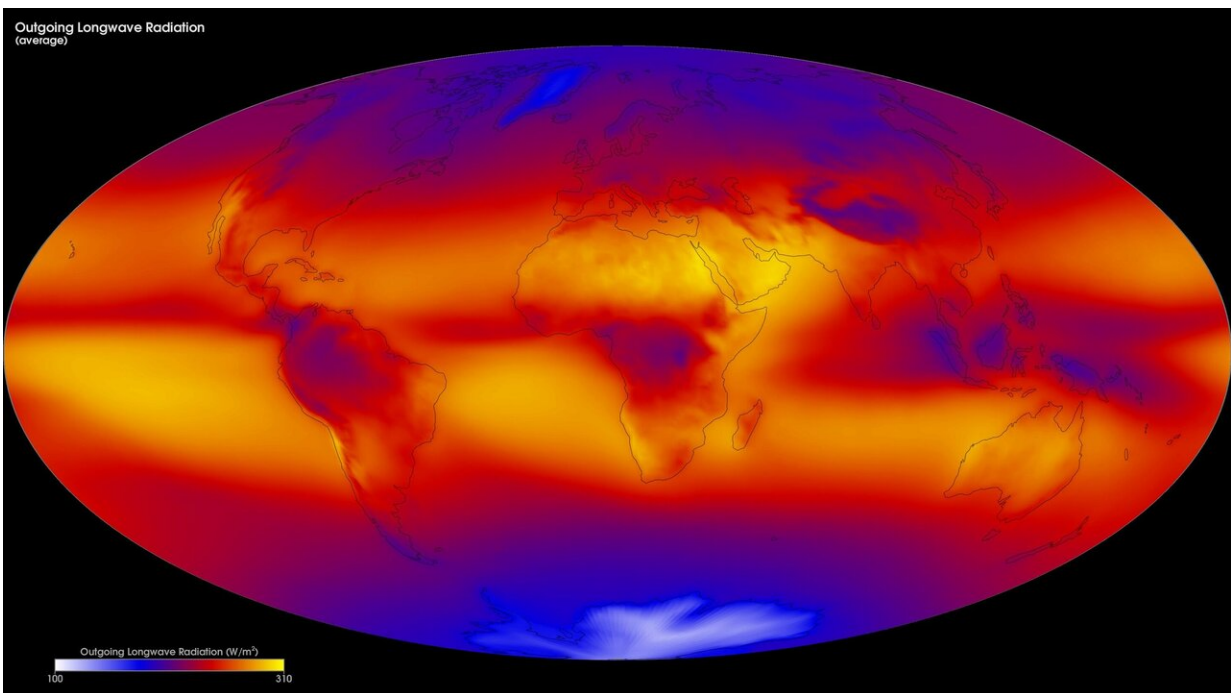


NASA selects new instrument to continue key climate record

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Earth's outgoing longwave, or heat, radiation shown here as the average from 2000 to 2015 were measured by the Clouds and the Earth's Radiant Energy System (CERES) instruments on NASA's Aqua and Terra satellites. Bright yellow and orange indicate high heat emission, purple and blue indicate intermediate emissions, and white shows little or no heat emission. Credit: NASA

NASA has selected a new space-based instrument as an innovative and

cost-effective approach to maintaining the 40-year data record of the balance between the solar radiation entering Earth's atmosphere and the amount absorbed, reflected, and emitted. This radiation balance is a key factor in determining our climate: if Earth absorbs more heat than it emits, it warms up; if it emits more than it absorbs, it cools down.

The new instrument, named Libera, is NASA's first [mission](#) selected in response to the 2017 National Academies' Earth Science Decadal Survey. The project's principal investigator is Peter Pilewskie of the University of Colorado Laboratory for Atmospheric and Space Physics in Boulder, Colorado.

"This highly innovative instrument introduces a number of new technologies such as advanced detectors that will improve the data we collect while maintaining continuity of these important radiation budget measurements," said Sandra Cauffman, acting director of the Earth Science Division at NASA Headquarters in Washington.

Libera will measure [solar radiation](#) with wavelengths between 0.3 and 5 microns reflected by the Earth system and infrared radiation with wavelengths between 5 and 50 microns emitted from the Earth system as it exits the top of the atmosphere. The sensor will also measure the total radiation leaving the Earth system at all wavelengths from 0.3 to 100 microns. An innovative additional "split shortwave" channel measuring radiation between 0.7 and 5 microns has been added to enable new Earth [radiation](#) budget science.

These wavelength ranges allow scientists to understand changes to Earth's climate system such as whether the planet is getting brighter or darker, and heating up or cooling down. The data will be available publicly following a brief checkout and commissioning period.

The new instrument was selected competitively from four proposals

considered under NASA's first Earth Venture Continuity opportunity, a new type of investigation in this class. NASA Earth Venture missions are led by principal investigators, competitively selected, and are cost- and schedule-constrained.

Earth Venture Continuity missions focus on demonstrating innovative, low-cost approaches to maintaining targeted measurements important to the Earth [science](#) community in an unbroken and consistent way. The National Academies' Decadal Survey recommended this new way to continue existing measurements of vital importance over the long term.

Libera is named after the daughter of Ceres, the Roman goddess of agriculture. The name acknowledges the relationship between this new mission and the Clouds and the Earth's Radiant Energy System (CERES) instruments that currently make the [radiation balance](#) measurements that Libera will continue. Six CERES instruments are currently collecting data on NASA and National Oceanic and Atmospheric Administration satellites.

The new research instrument will fly on NOAA's operational Joint Polar Satellite System-3 (JPSS-3) satellite, which is scheduled to launch by December 2027.

Earth Venture missions are managed by the Earth System Science Pathfinder program, located at NASA's Langley Research Center in Hampton, Virginia, for the agency's Science Mission Directorate.

More information: For more information about the Earth Venture program, see essp.nasa.gov

Provided by NASA

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