

Greetings From

TROPICS

Your Eyes in the Sky!



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This year,

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NASA is looking to answer some of the most pressing questions we have about

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our planet, measuring things like sea and land surface temperatures,

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rainfall, our water resources, storm system precipitation

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structure, and much more, from space. Buckle

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your seatbelts, for a whirlwind tour of Earth-observing satellites launching to

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low-Earth orbit in 2022.

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[seagull noises]

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Daydreaming of a trip to the lake?

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SWOT focuses on the planet's most precious resource: Water. The Surface Water

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and Ocean Topography mission will help researchers compile the first global

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survey of Earth's surface freshwater and study our changing ocean

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land coasts. It will use a new radar instrument to measure the elevation

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of water in major lakes, rivers, and wetlands as well as the ocean.

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SWOT's water height data helps track regional sea level changes,

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observe small-scale ocean currents and eddies,

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monitor coastal processes, and assess water resources

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on land. With a warming climate, an inventory of Earth's freshwater

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storage and an understanding of sea level rise's effects on coastal communities

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is essential in order to help decision-makers manage their water

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resources and plan for hazardous events.

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[ocean waves]

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Nothing can ruin a vacation quite

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like stormy weather. Luckily, NASA

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is launching TROPICS, a collection of six small satellites

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specially designed to help scientists better understand damaging

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tropical storms and hurricanes.

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These small but mighty satellites each have a miniaturized microwave

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radiometer that peers through clouds and inside developing storms.

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Traveling in pairs in three different orbits,

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TROPICS will provide near-hourly observations of a storm's

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precipitation, temperature, and humidity.

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Collectively, TROPICS will be able to observe Earth's surface more frequently

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than current weather satellites making similar measurements. This will give scientists

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and forecasters more data to help them understand how

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damaging tropical storms form, grow, and intensify.

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In June 2021, the TROPICS first proof of concept

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satellite launched, collecting important data that showed the promise

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Use of these small satellites to help us prepare for the weather ahead.

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[wind noises]

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There's more to dust than meets the eye. Winds on Earth

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kick up millions of tons of dust every year, and where that dust goes

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matters! Nutrient-rich dust from the Sahara Desert, for example,

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is blown across the Atlantic Ocean where it fertilizes the Amazon rainforest.

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But dust in the atmosphere can also reflect or trap additional heat

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close to Earth's surface, depending on its color and composition

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– exacerbating or diminishing the greenhouse effect.

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That's where EMIT comes in. The Earth surface Mineral dust source Investigation

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will use spectroscopy – a process that splits light into a spectrum of wavelengths,

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which can be used to “fingerprint” different types of materials, including dust.

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In this way, EMIT will observe the mineral composition of Earth's dust

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from its perch on the International Space Station.\hEMIT's data

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will help scientists map the areas on Earth that produce different types of dust,

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and help them better understand the behavior of all that dust in the wind.

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[wind noises]

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For the last decade, a wealth of essential data has been streaming

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back to Earth from satellites in the Joint Polar Satellite System,

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a collaboration between NASA and NOAA.

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Onboard suites of instruments measure ... nearly

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everything you can think of.\hOver land, they measure vegetation,

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fires, droughts, snowfall, and ice cover,

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just to name a few. Over the oceans – sea surface temperatures

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and algal blooms. And in the atmosphere –

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clouds, rainfall, heat, smoke, dust storms,

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ozone, and air quality. These data feed

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our daily weather forecasts, helping weather models see further

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into the future to predict severe weather like hurricanes, tornadoes,

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and snow storms, and monitor our changing climate.

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In 2022, NASA and NOAA will launch

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JPSS-2, the next mighty bird in the JPSS

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program. JPSS-2 and its successors

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will carry on the decades-long Earth-observing legacy

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through 2038.