



Earth at Night in the Artemis Era

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NASA GSFC-610



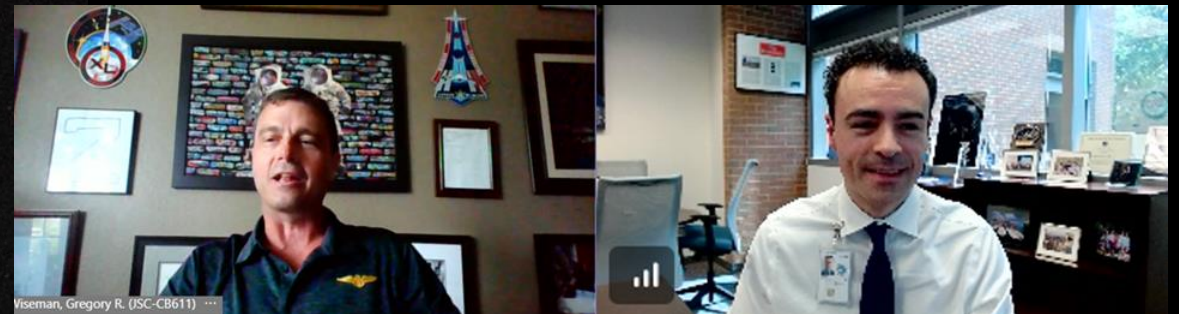
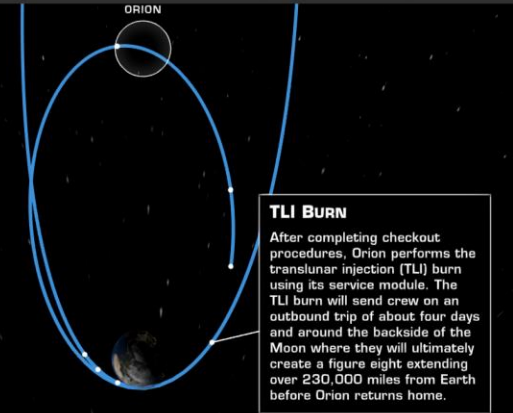
A Moonlit Earth as Seen From Artemis II



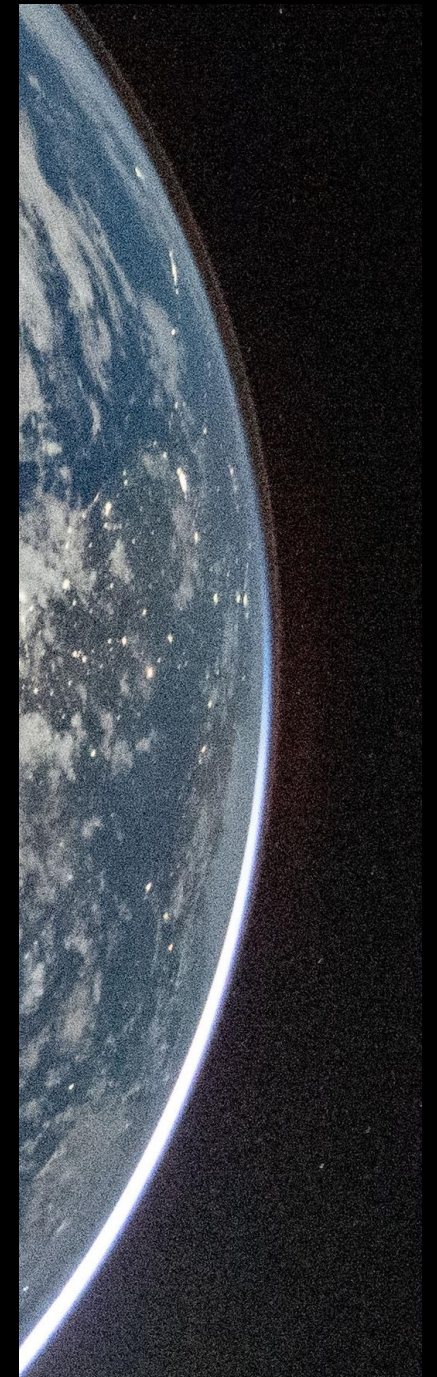
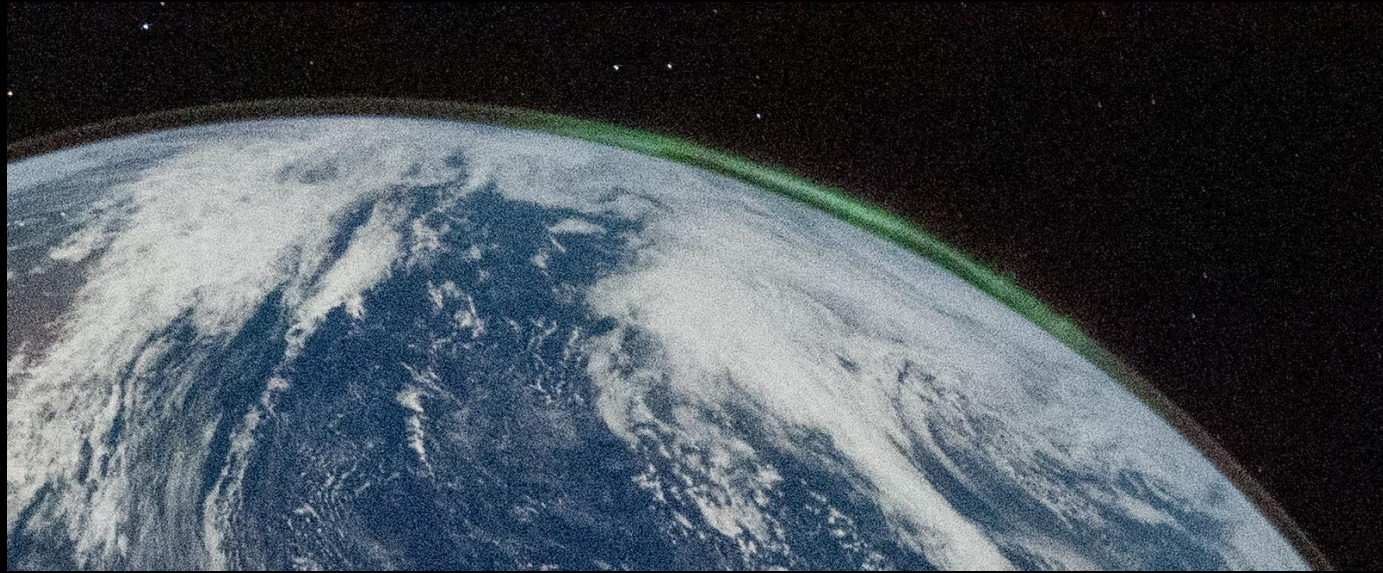
Black Marble joins Artemis Science Team:

GSFC will provide georectification and analytics of nighttime light imagery taken from future Artemis missions.

ARTEMIS II



Planning Meeting with Artemis 2 Crew, 6/9/2026



Earth Limb Zoom In

April 3, 2026 – A Sliver of Earth

Earth at Night is visually compelling, physically complex, and scientifically underexplored

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Photograph taken
during Artemis II mission

BLACK MARBLE

NASA Nighttime Light Images Reveal Rapid, Localized Change in Human Activity on Earth

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A newly published finding from NASA's Black Marble, based on eight years of satellite observations, shows that while global nighttime lights increased by 34% between 2014 and 2022, localized observations reveal a dynamic world flickering with variable and increasingly rapid change.

1.16M

nighttime light satellite
observations collected
between 2014 and 2022

Widespread

Adoption

>100m

Black Marble scenes
downloaded from NASA's
Earthdata portal

63k

Article Downloads, ranked
99th percentile (110th of
354,024 tracked articles)

“Letting operators, investors, and insurers know that this is happening is a huge value proposition... to have this data be public is huge for energy security.”

- Deborah Gordon, Rocky Mountain Institute

BLACK MARBLE APPLICATIONS



Energy System
Transitions



Infrastructure &
Economic
Impacts

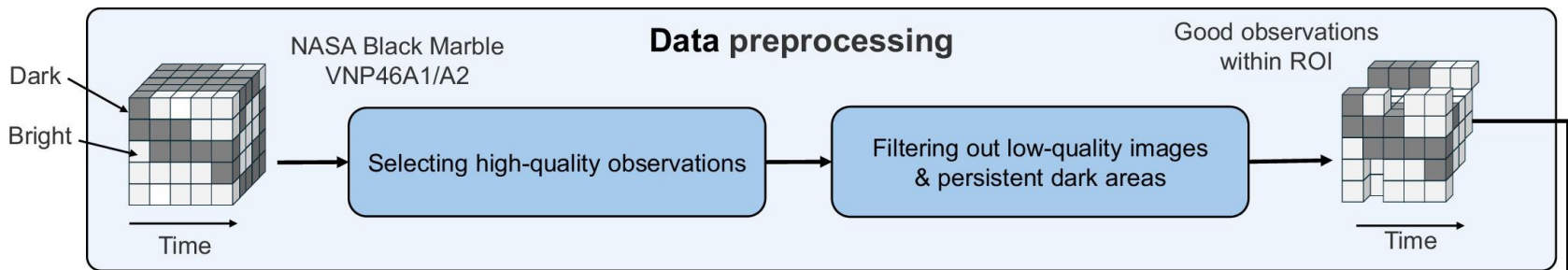


Disaster
Response &
Recovery

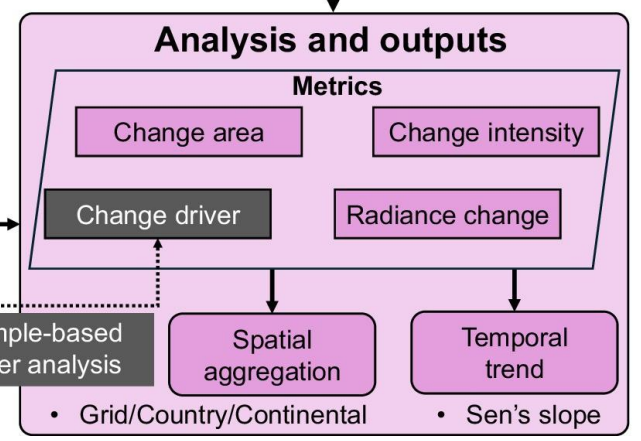
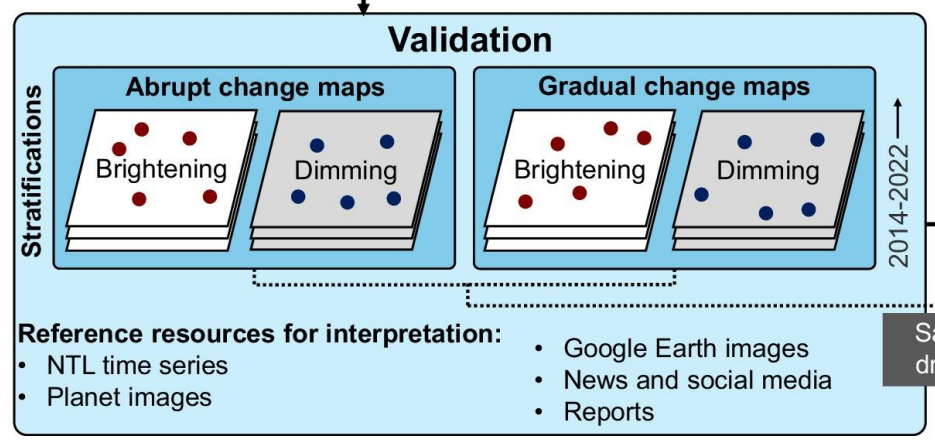
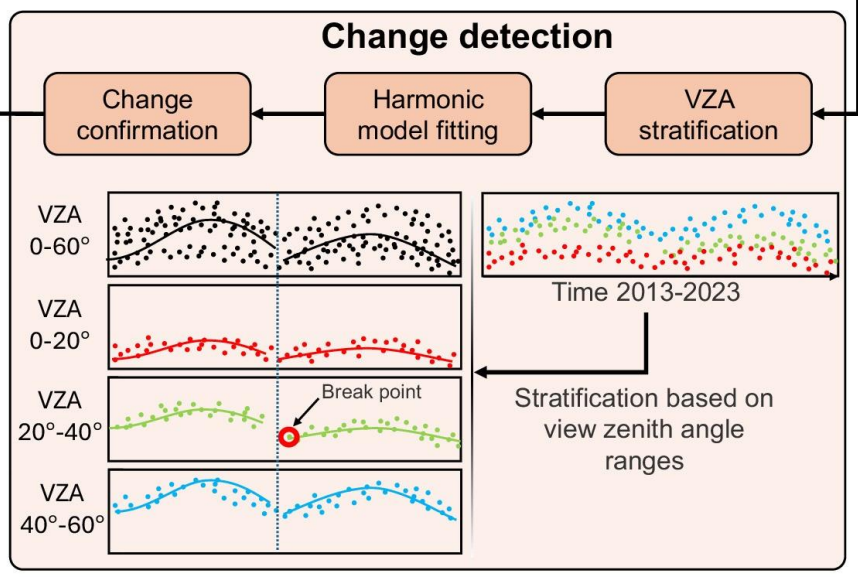
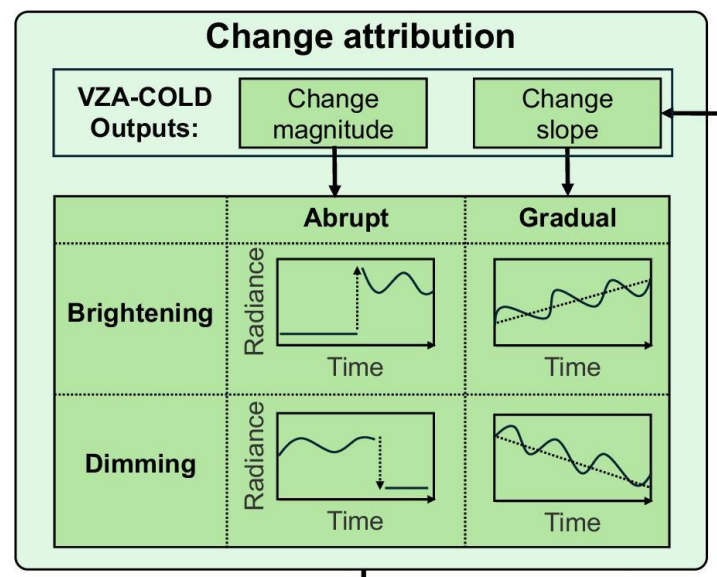


Societal
Resilience





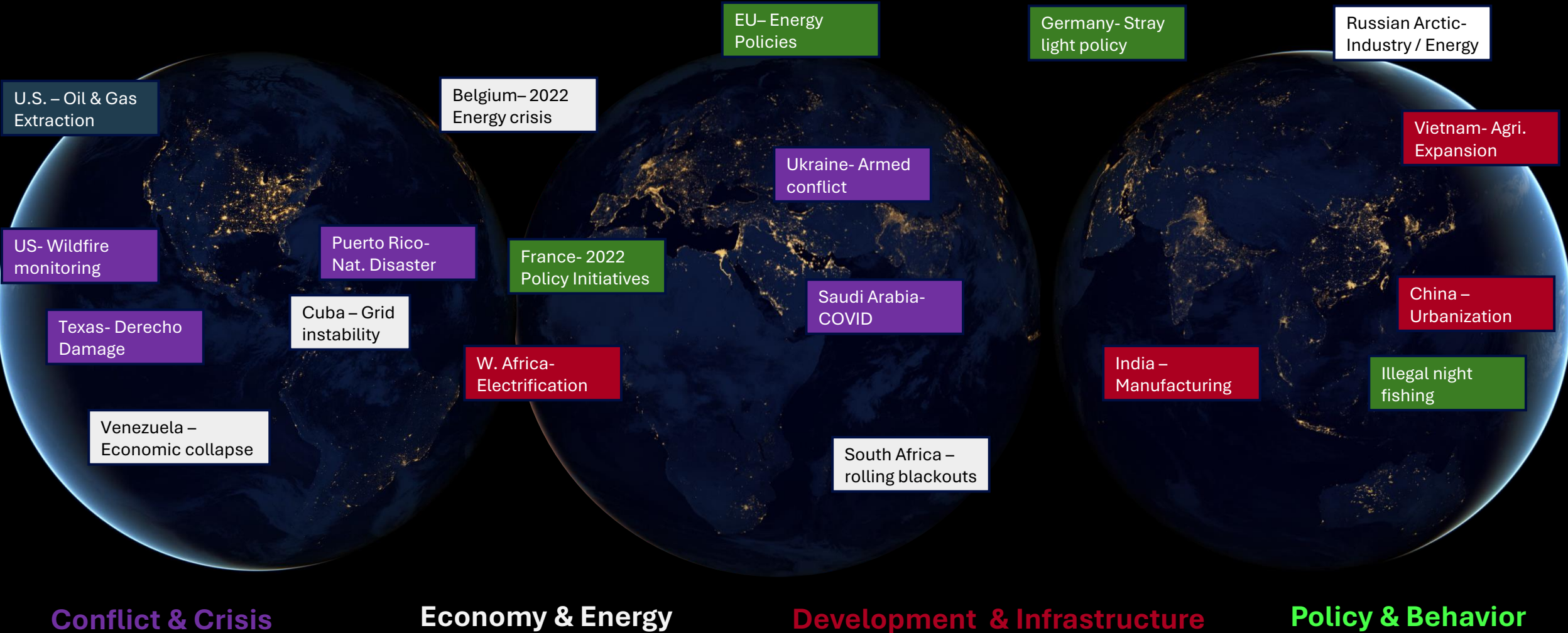
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NASA's Black Marble

What can we see?

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Conflict & Crisis

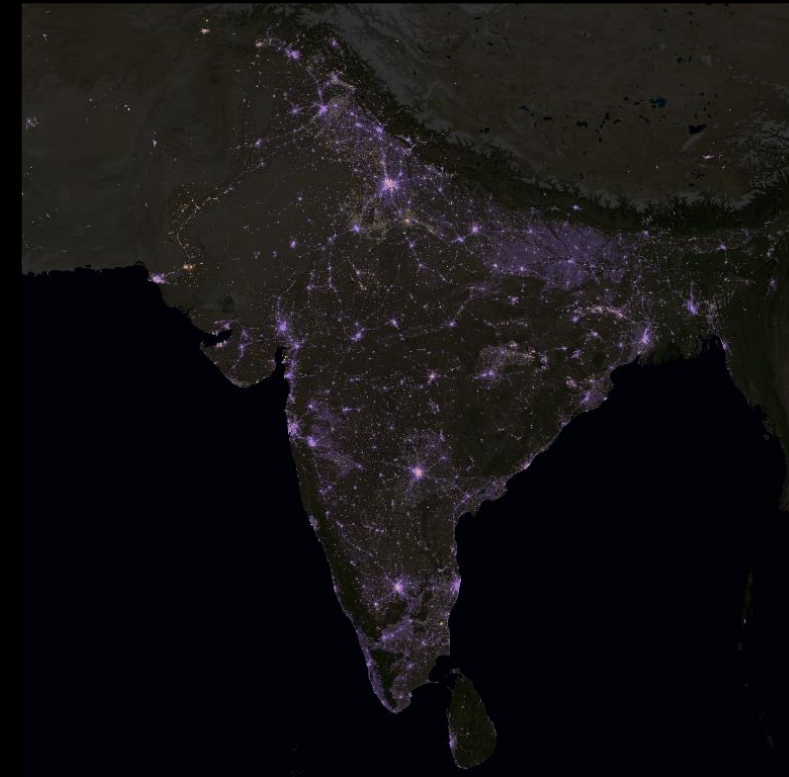
Economy & Energy

Development & Infrastructure

Policy & Behavior

NASA's Black Marble Development and Infrastructure

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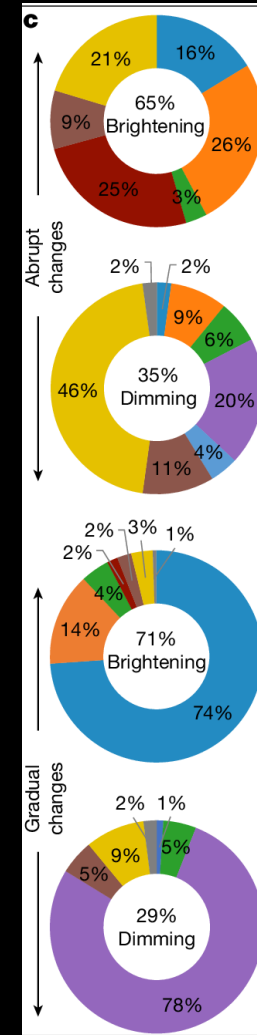
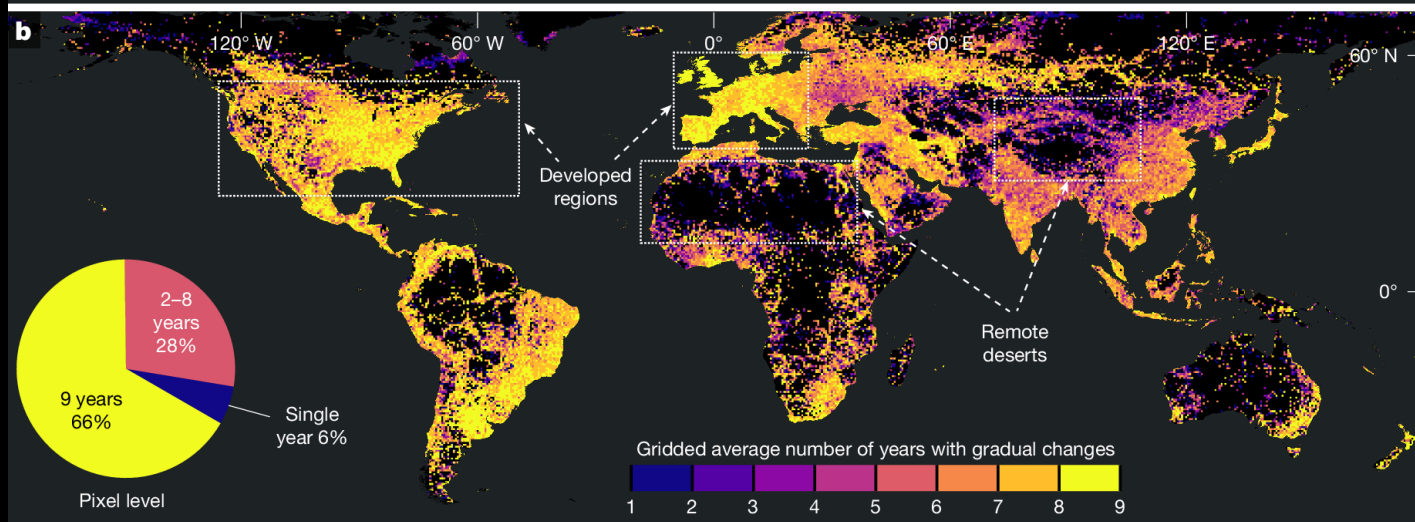
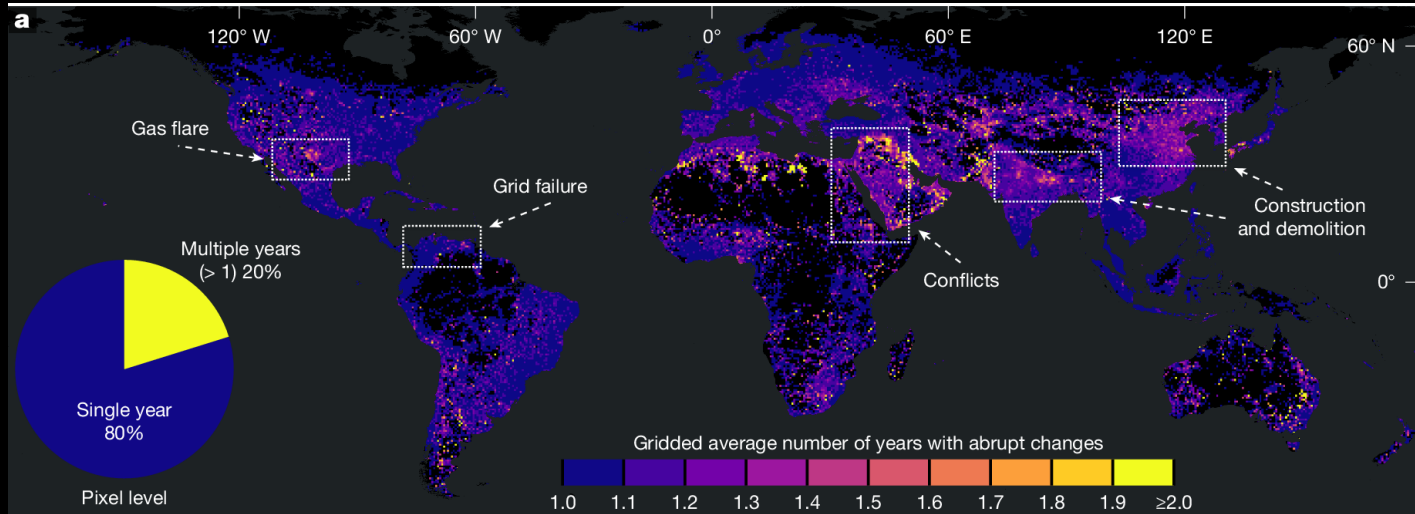


Nighttime lights composites over India in 2012 (left) and 2023 (center). India has shown increased brightness over this period with net radiance change with regions of increased light depicted in purple and regions with less light depicted in orange.

NASA's Black Marble

India- There is a lot more happening

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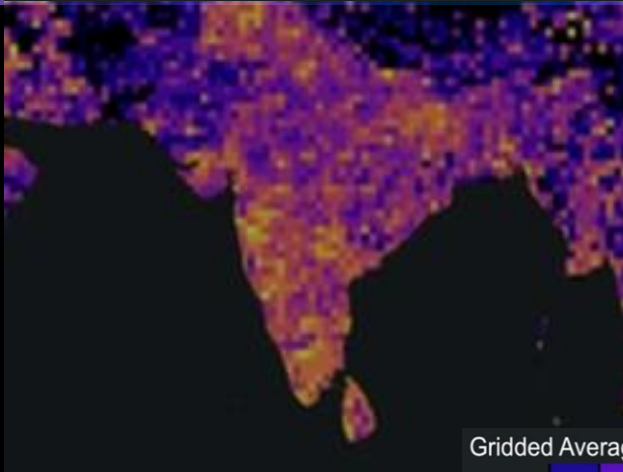
*from Stokes and Seto,
(2019, RSE)*

NASA's Black Marble

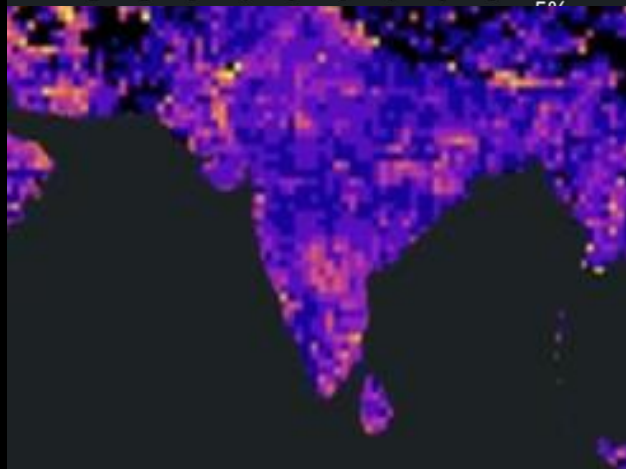
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Gridded Average Number of Years with Brightening Changes

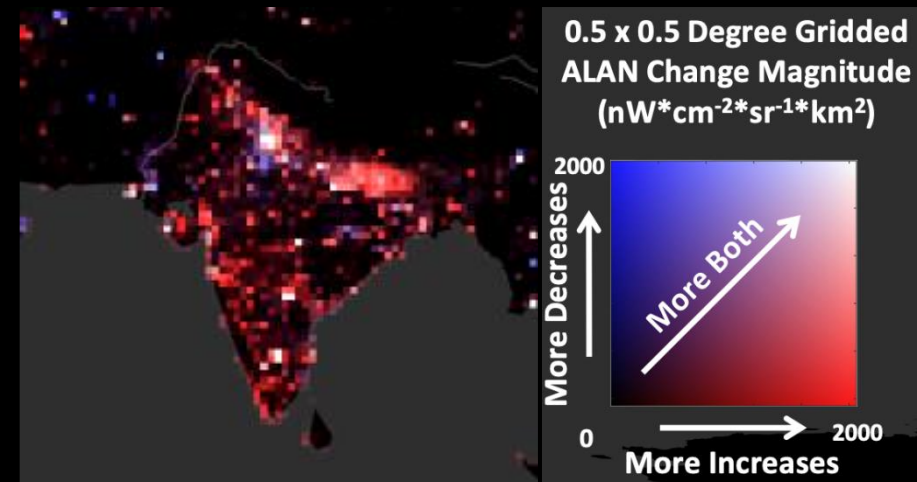


Gridded Average Number of Years with Dimming Changes



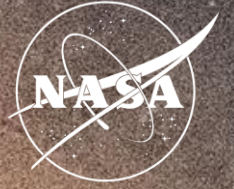
Artificial Light at Night (ALAN) Change

- Repeated brightening and dimming show that India's nighttime light footprint is highly dynamic.
- Change is both abrupt and gradual, reflecting urban growth, construction, electrification, and shifting activity.
- Brightening is widespread, with cumulative brightened area nearly **6×** the initial ALAN extent.
- The key result is not just net growth, but the **pace and frequency of local change**.



NASA's Black Marble: The Science Behind Earth at Night

National Aeronautics and
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A calibrated record for measuring human activity, infrastructure change, and resilience from Space.

Resilience	<ul style="list-style-type: none">• Detect outages, recovery, and infrastructure disruption.• Support disaster response where ground data are limited.
Energy Security	<ul style="list-style-type: none">• Track electrification, flaring, grid stress, and industrial activity.• Provide an independent signal when official data are delayed.
Growth Areas	<ul style="list-style-type: none">• Inform Earth System predictions.• Enhanced AI/ML workflows.• Shape future Earth-at-Night observation needs.

