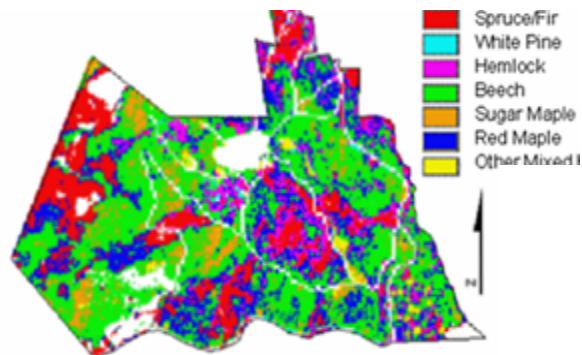


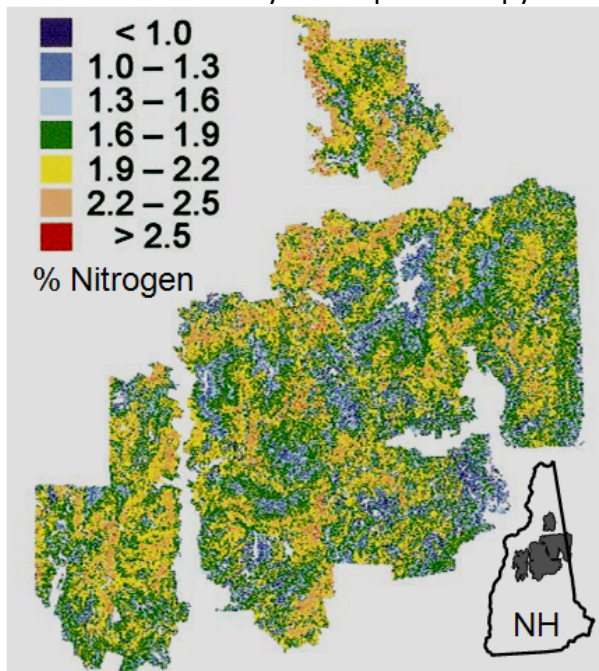
Woody Turner (charts from JPL/Rob Green and the HypsIRI Team) October 16, 2012

Visible ShortWave InfraRed (VSWIR)
Imaging Spectrometer

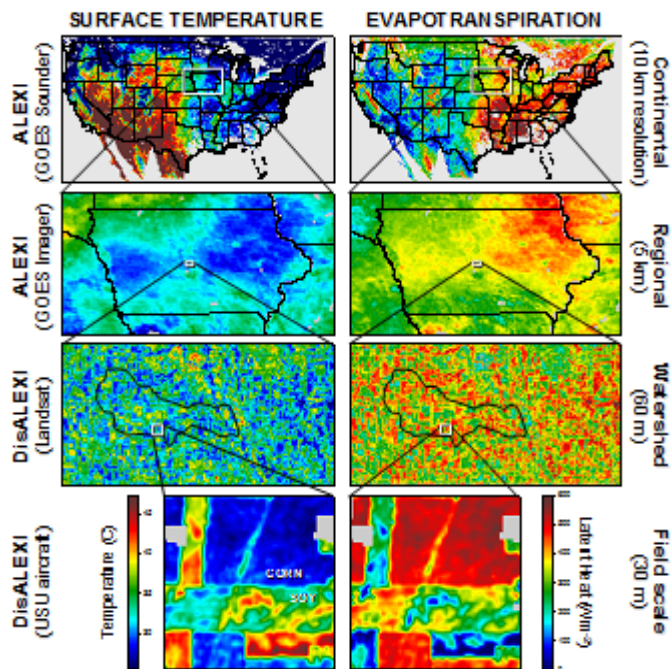
Map of dominant tree species,
Bartlett Forest, NH



Biochemistry from Spectroscopy



Multispectral Thermal InfraRed
(TIR) Scanner





HyspIRI: Key Science and Science Applications



Climate: Ecosystem biochemistry, condition & feedback; spectral albedo; carbon/dust on snow/ice; biomass burning; evapotranspiration

Ecosystems: Global plant functional-type, physiological condition, and biochemistry including agricultural lands

Fires: Fuel status, fire occurrence, severity, emissions, and patterns of recovery globally

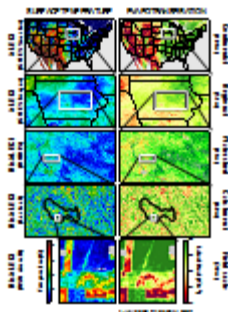
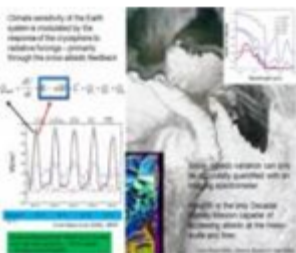
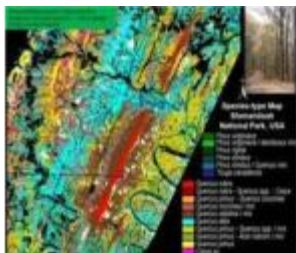
Coral reef and coastal habitats: Global composition and status

Volcanoes: Eruptions, emissions, regional and global impact

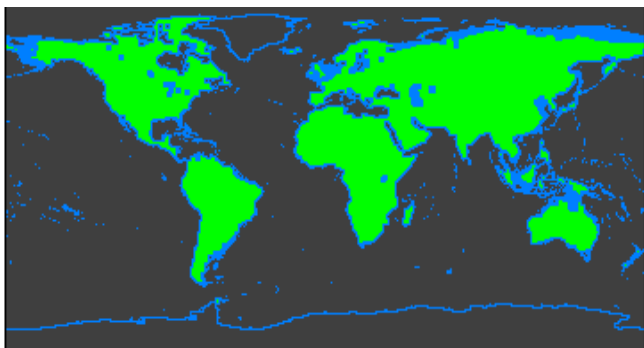
Geology and resources: Global distributions of surface mineral resources and improved understanding of geology and related hazards



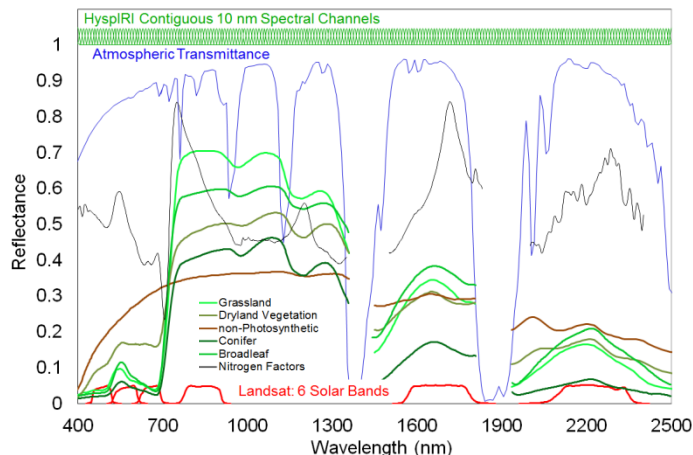
The Decadal Survey Science and Climate Science is Achieved with These Measurements

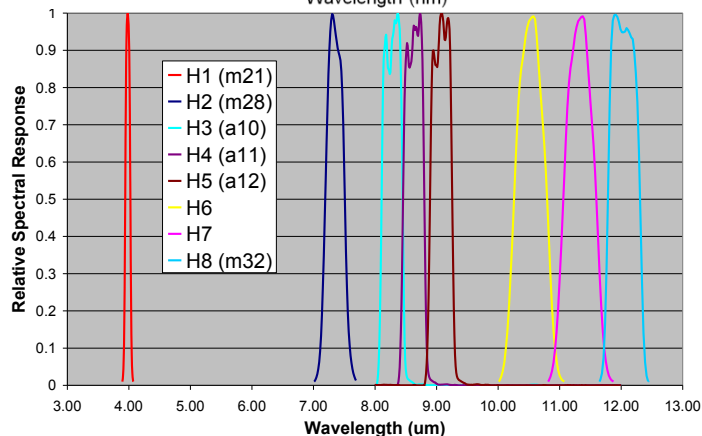
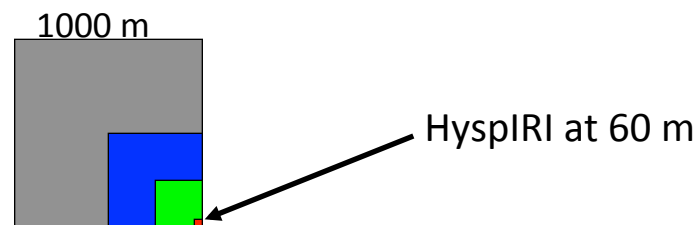
- Key HypsIRI climate objectives from the Decadal Survey and IPCC
 - Ecosystem Measurement for Climate Feedback
 - Black Carbon/Dust Effects on Snow and Ice
 - Carbon Release from Biomass Burning
 - Evapotranspiration and Water Use and Availability
 - Critical Volcanic Eruption Parameters
- Imaging Spectrometer (VSWIR)
 - Pattern and Spatial Distribution of Ecosystems and their Components
 - Ecosystem Function, Physiology and Seasonal Activity
 - Biogeochemical Cycles
 - Changes in Disturbance Activity
 - Ecosystem and Human Health
 - Earth Surface and Shallow Water Substrate Composition
- Multi-Spectral Thermal InfraRed (TIR)
 - Volcanoes/Earthquakes
 - Wildfires
 - Water Use and Availability,
 - Urbanization/Human Health
 - Earth surface composition and change
- Combined Imaging Spectrometer and Multi-Spectral Thermal Science
 - Coastal habitats, and inland aquatic environments
 - Wildfires
 - Volcanoes
 - Ecosystem Function and Diversity
 - Land surface composition and change
 - Human Health and Urbanization



HyspIRI is a global mission, measuring land and shallow aquatic habitats at 60 meters and deep oceans at 1km every 5 days (TIR) and every 19 days (VSWIR)



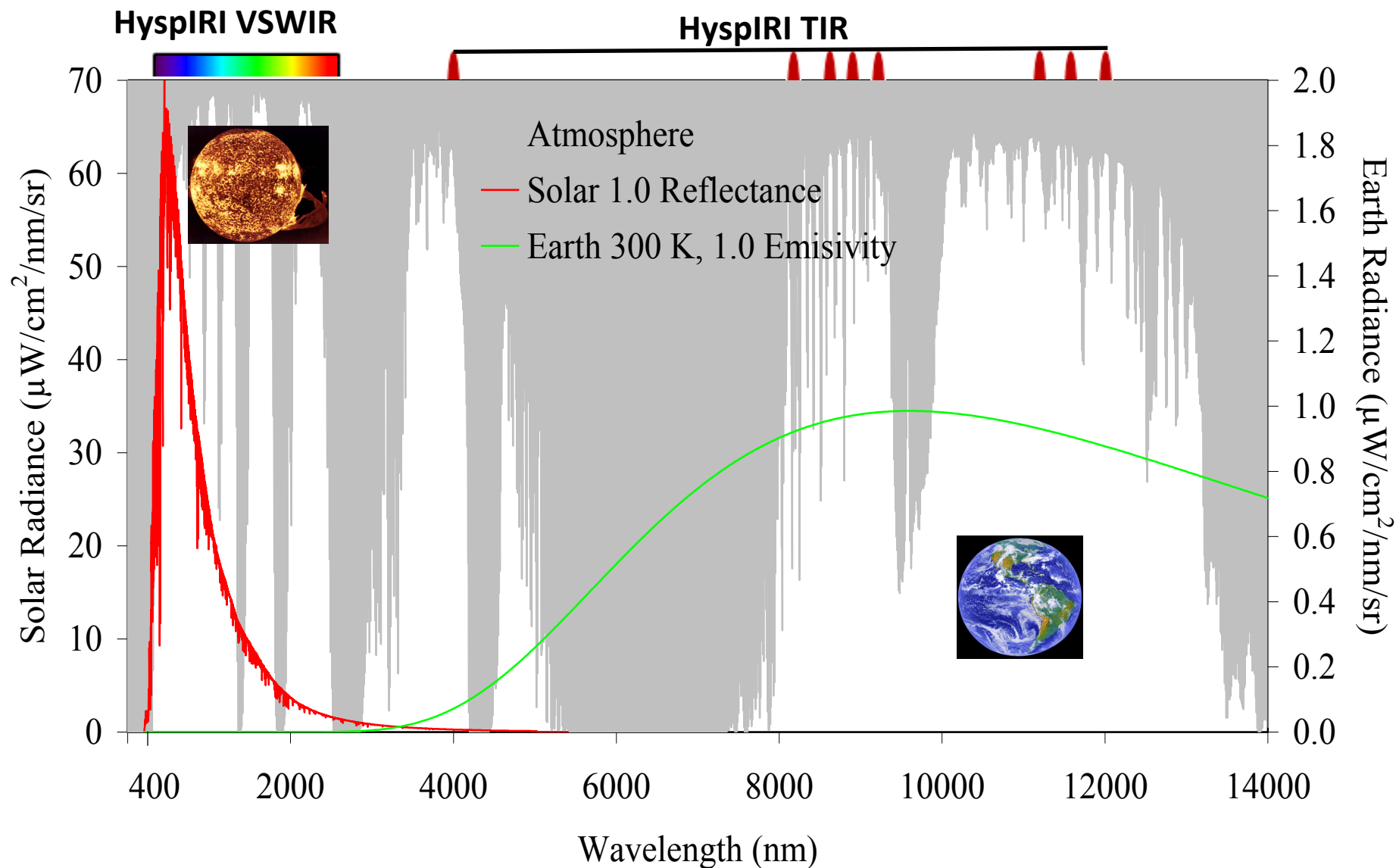
HyspIRI's VSWIR imaging spectrometer directly measures the full solar reflected spectrum of the Earth from 380 – 2500 nm at 10 nm with a high signal-to-noise ratio

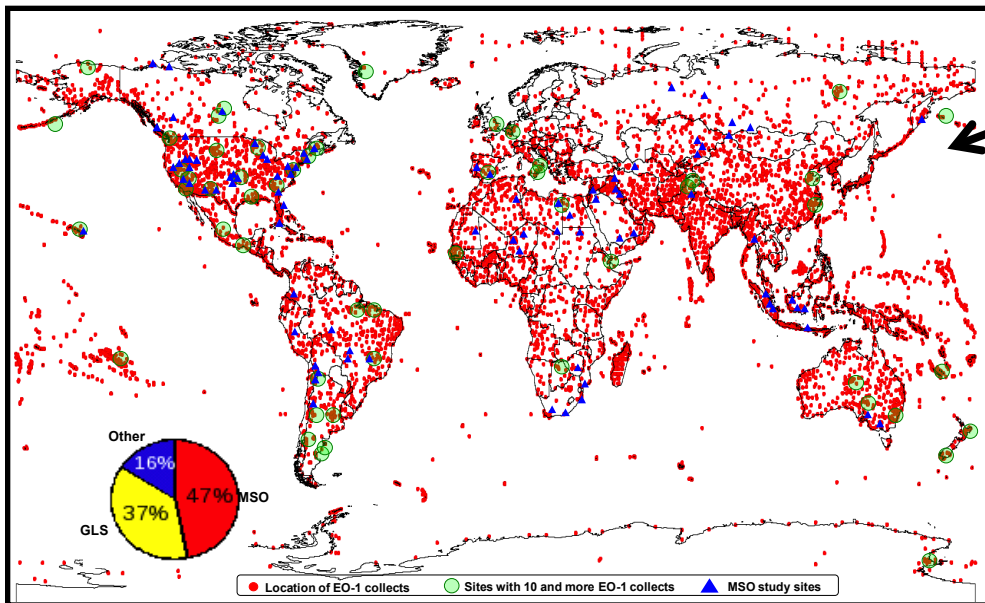


HyspIRI's TIR directly samples the Earth's emitted thermal energy in 7 bands between 7.5-12 μm , & 1 band between 3-5 μm

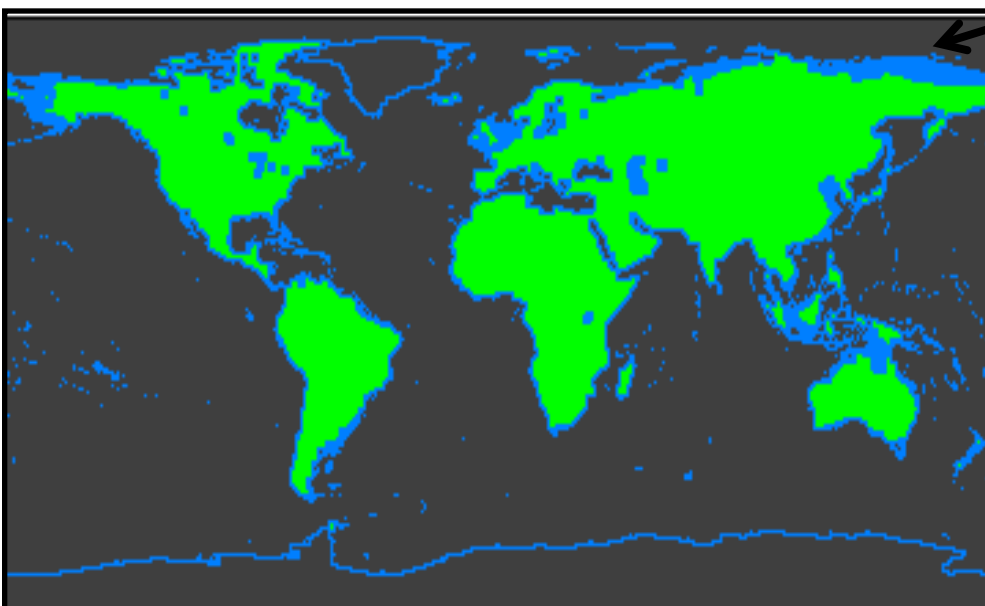


HyspIRI Measures the Optical Spectrum





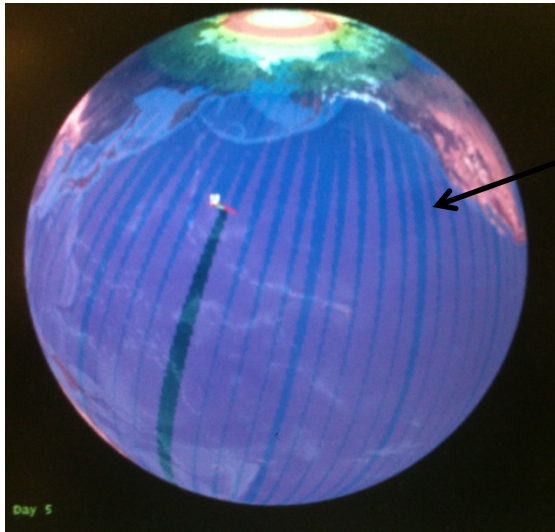
EO-1 Hyperion acquisitions in 10 years.
Technology demonstration



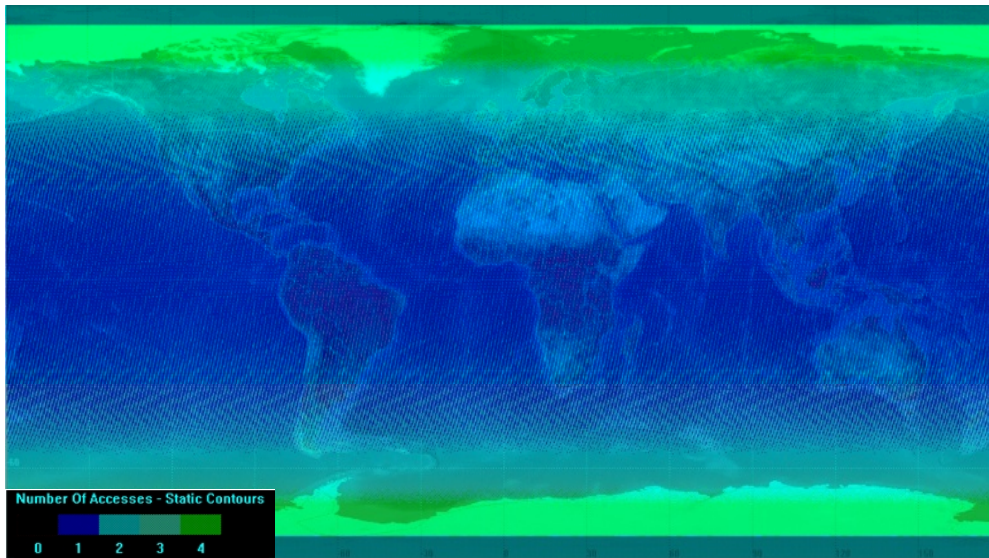
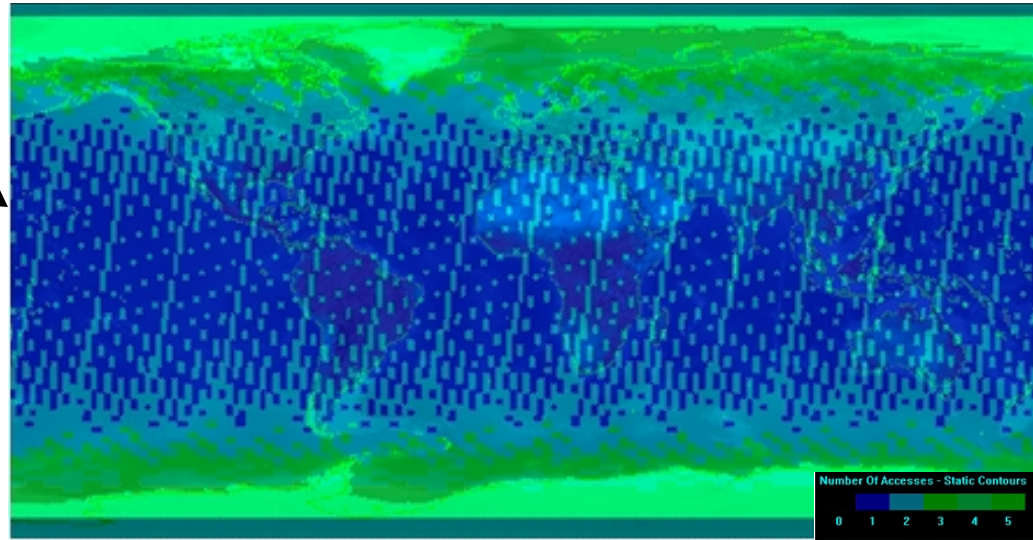
HyspIRI VSWIR provides complete terrestrial coverage every 19 days.

- It would take Hyperion 100 years to acquire what HyspIRI measures in 1 year.
- **For climate, impact and adaptation, HyspIRI (VSWIR and TIR) has orders of magnitude greater scientific measurement coverage of any planned international mission.**

HyspIRI is a Global Earth Science and Science Applications Mission

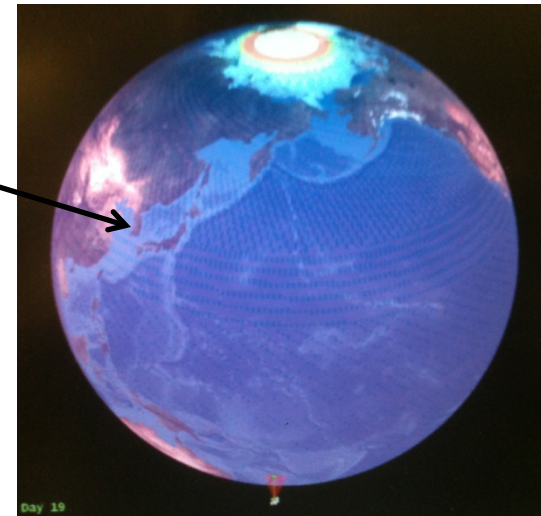


TIR Coverage
after 5 days



VSWIR
Coverage after
19 days

Due to the min 20 deg
Sun elevation angle
constraint on the
VSWIR acquisition,
the latitudes covered
change with the
seasons





Summary and Conclusions

- The basis for the global HypsIRI science measurements is established, unique and critical.
 - **Climate:** Ecosystem biochemistry, condition & feedback; spectral albedo; carbon/dust on snow/ice; biomass burning; evapotranspiration
 - **Ecosystems:** Global plant functional-type, physiological condition, and biochemistry including agricultural lands
 - **Fires:** Fuel status, fire occurrence, severity, emissions, and patterns of recovery globally
 - **Coral reef and coastal habitats:** Global composition and status
 - **Volcanoes:** Eruptions, emissions, regional and global impact
 - **Geology and resources:** Global distributions of surface mineral resources and improved understanding of geology and related hazards
- The HypsIRI mission concept to achieve these science and science application measurements is mature and straightforward to implement with no new technology
- The HypsIRI global measurements are unique and complement other planned Earth science missions

