GEO-CAPE Ocean Color Applications

Geostationary for Coastal & Air Pollution Events NASA Satellite Mission

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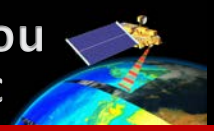
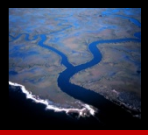
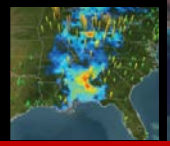



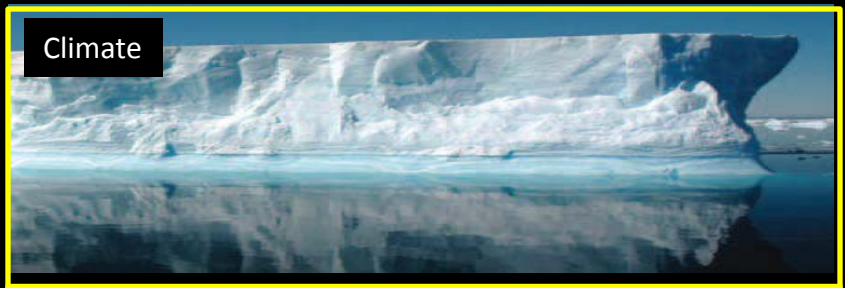




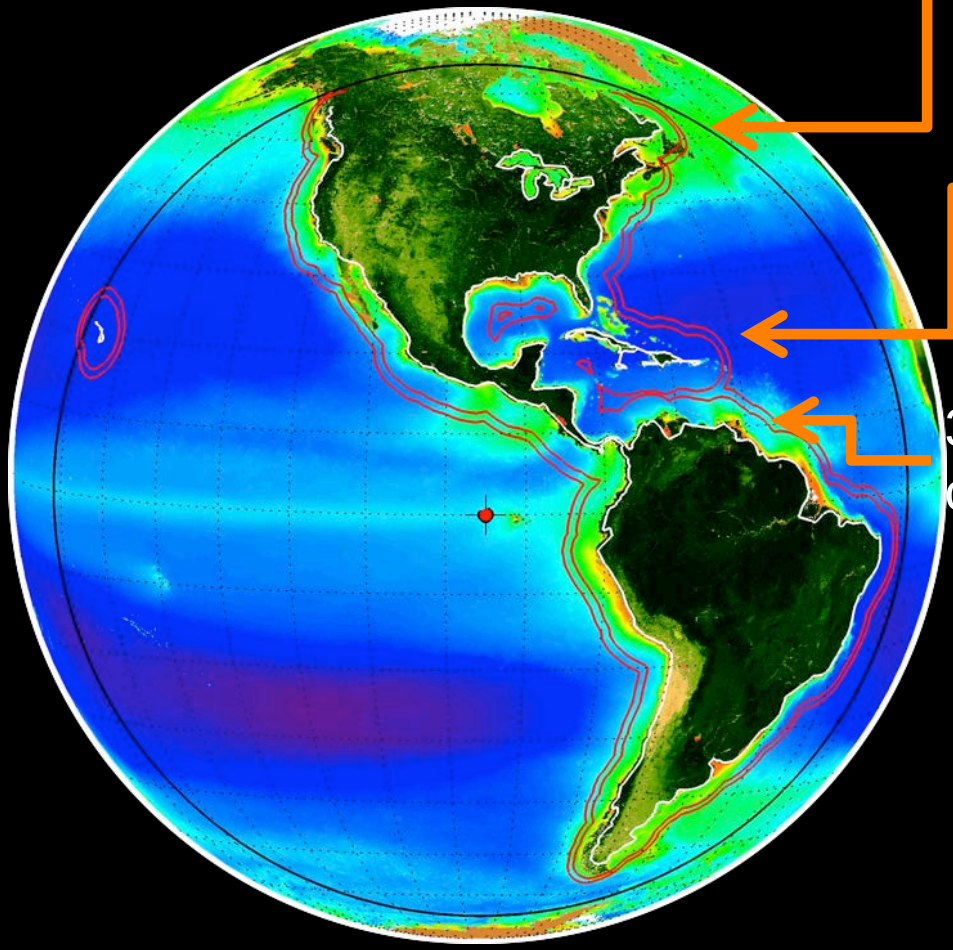



GEO-CAPE
Coastal Ocean Color Applications

The NASA Applied Sciences Program promotes and funds activities
that discover and demonstrate innovative uses and practical benefits of NASA's Earth science resources



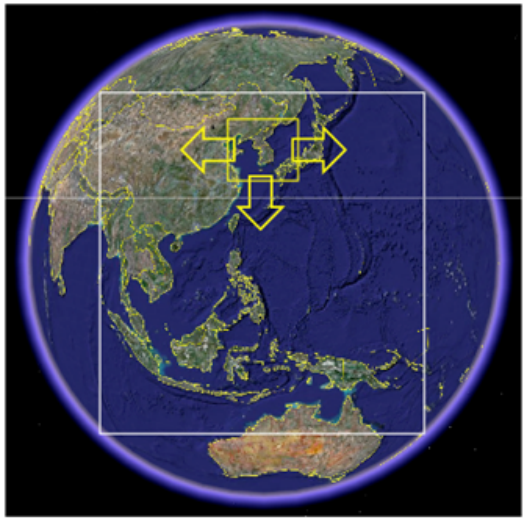
Geostationary view from 95°W



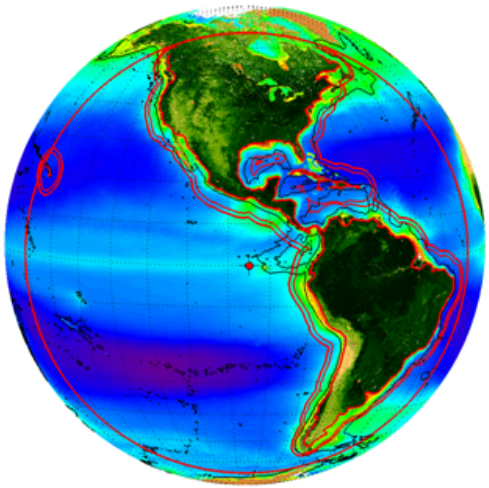
• Where atmospheric correction is feasible, coverage extends to ~60º latitude in summer and ~50º in winter and from ~35ºW to ~155º W (at equator).

Constellation of Geo Ocean Color Missions

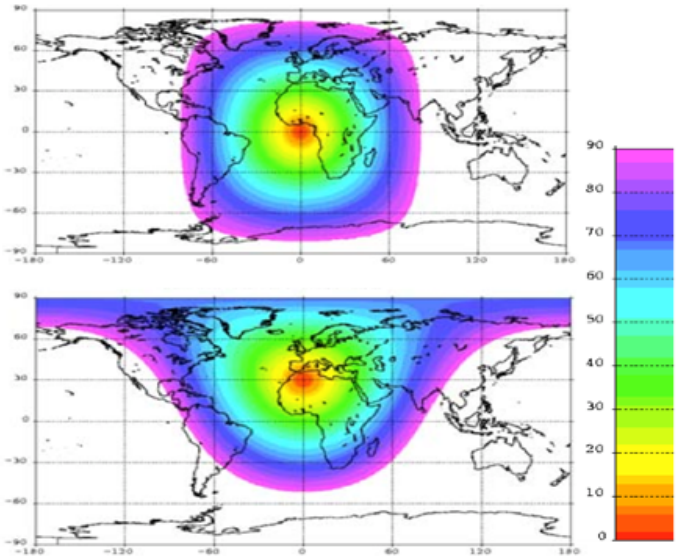
- Diurnal variability of coastal processes and hazards observable from Geo.
- Several other nations are planning Geo ocean color missions: Korea (operational follow-on), Europe and India.



GOCI-II: 2018



GEO-CAPE

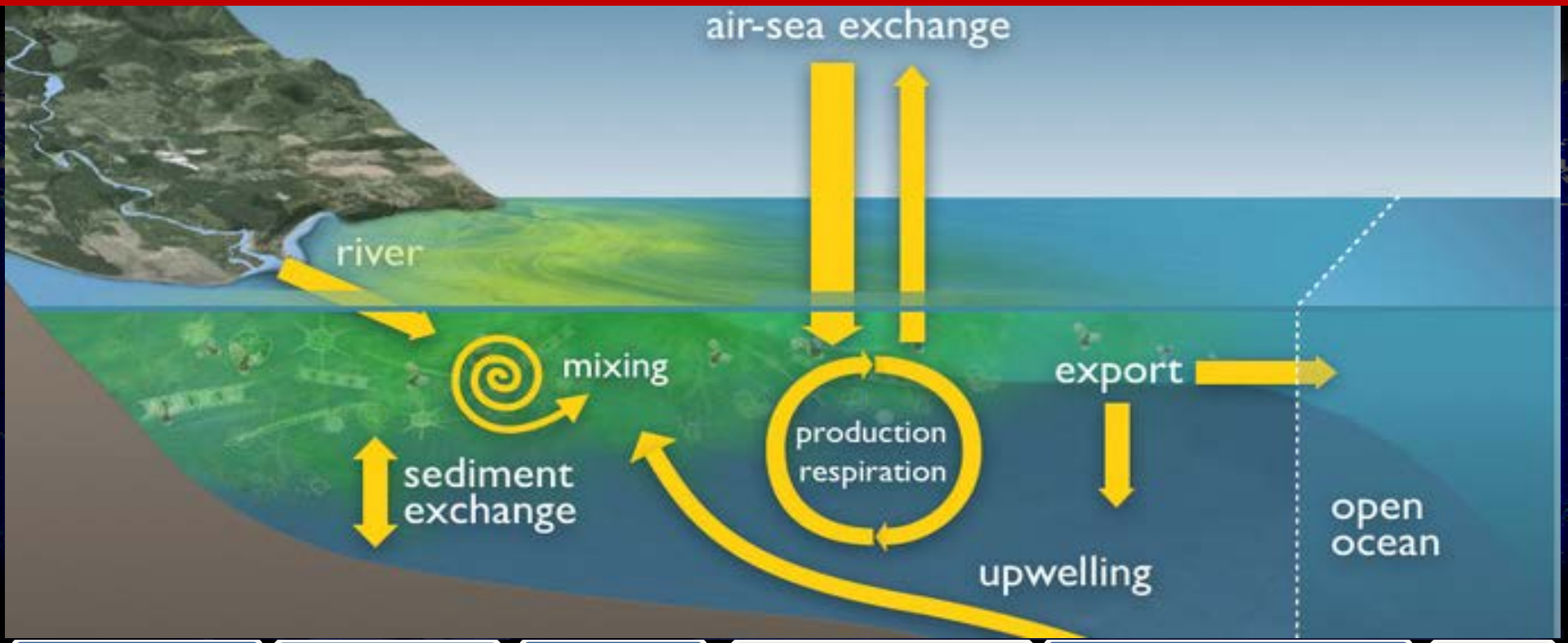


HOCI or OCAPI

- Harmonization through constellation promotes consistent global assessment of coastal ecosystems and carbon fluxes.
- Synergies with PACE: improve global productivity measurements, on-orbit cross-calibration, joint cal/val activities, etc.

GEO-CAPE

Coastal Ocean Color Applications



Hazards/Disasters | **Water Resources** | **Oceans/Lakes** | **Ecological Forecasting** | **Air Quality/Human Health** | **Climate**

- Post-storm Assessments (e.g., flood detection); sediment transport (navigation)
- Detection and tracking of oil spills; Nearly continuous coverage of coastal hazard or other event
- Water Quality Indicators and management of water resources in lakes and coastal waters
- Better monitoring, predictions and early-warnings for HABs ; fisheries management
- Air Quality in Coastal Cities, and impacts of anthropogenic air pollution on human health
- Mapping and assessment of carbon dynamics, sources and fluxes & integration into climate models

Overall: Improve assimilation of satellite data into operational models to:
(i) assess/improve management of coastal resources , and (ii) improve forecasting/predictions.

Inputs to Applications Traceability Matrix

Agency	Applications	Satellite products	Spatial requirements	Temporal requirements
NOAA	Habitat assessment, fisheries	Chlorophyll, Rrs(λ),	100m – 4km	3hrs - daily
Council				
BOEM	Ecological models, current trajectory, sediment transport, oil detection and thickness	Chlorophyll, NPP, currents, cdom, SPM	Not specified	Not specified

Ocean Color Measurement Requirements needed to further improve coastal & applications research (in addition to appropriate radiometric sensitivity):

→ Improved spectral resolution, >16 bands/hyper-spectral
→ Improved spectral range: UV-NIR-SWIR, thermal imagery

} due to optical complexity of coastal areas

→ Improved spatial resolution, < 500 m
→ Improved temporal resolution, > 1 image per day

} due to spatio-temporal scales of physical & biogeochemical processes in coastal areas

GEO-CAPE Measurement & Instrument Requirements

	Threshold (min.)	Baseline (goal)
Temporal Resolution Targeted Events	<1 hour	<0.5 hour
Survey Coastal U.S.	<3 hours	<1 hour
Spatial Resolution (nadir)	375 m x 375 m	250 m x 250 m
Spectral Range	345-1050 nm; 2 SWIR bands 1245 & 1640 nm	340-1100 nm; 3 SWIR bands 1245, 1640, 2135 nm
Scan Rate	>25,000 km^2/min	>50,000 km^2/min
Spectral Resolution	UV-VIS-NIR: ≤5 nm; 400-450nm: ≤0.8nm (NO_2); SWIR: ≤20-40 nm	UV-VIS: ≤0.75 nm; SWIR: ≤20-50 nm
Signal-to-Noise Ratio (SNR) @ Ltyp for 70° solar zenith angle	1000:1 for 350-800 nm	1500:1 for 350-800 nm

Requirements provide for retrieval of aerosol properties & NO_2