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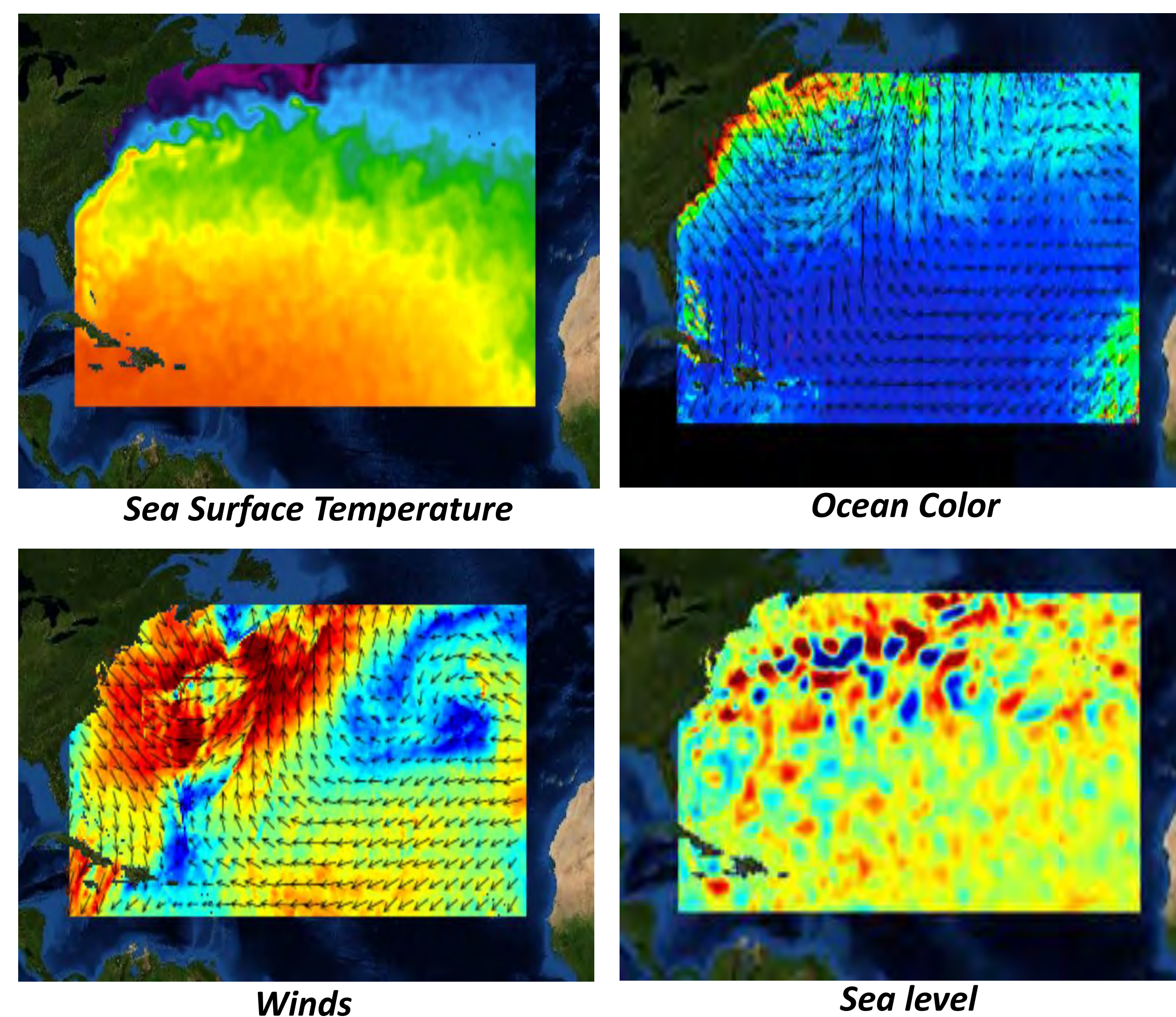
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ABSTRACT

The CEOS Ocean Variables Enabling Research and Applications for GEO (COVERAGE) initiative seeks to provide improved access to multi-agency ocean remote sensing that are better integrated with in-situ and biological observations, in support of oceanographic and decision support applications for societal benefit. COVERAGE is an international initiative and 3 year pilot project within the Committee on Earth Observation Satellites (CEOS) involving interagency participation. It aligns with programmatic objectives of CEOS and the missions of GEO-MBON (Marine Biodiversity Observation Network) and GEO-Blue Planet, which are to advance and exploit synergies among the many observational programs devoted to ocean and coastal waters. It focuses on implementing technologies, including cloud-based solutions, to provide a data rich, web-based platform for integrated ocean data delivery and access: multi-parameter observations, easily discoverable and usable, organized thematically, available in near real-time, collocated to a common grid and including climatologies. These will be complemented by a set of value-added data services available via the COVERAGE portal including an advanced Web-based visualization interface, subsetting/extraction, and other relevant on demand processing. It aims to stimulate work among the 4 CEOS Ocean VCs, also seeking feedback and discussion with the GHRST community. In addition to use case/requirements development and system architecture design, current work includes an assessment and inventory of candidate COVERAGE datasets, including for SST. The goal is to determine complementary, high value, interagency datasets to implement within the COVERAGE framework. As part of the SST component, comparisons have been undertaken between the MUR, CMC, and GMPE that are presented here.

CEOS OCEAN VIRTUAL CONSTELLATIONS



PLANNED FUNCTIONALITY

- Multi-parameter/platform Observations
 - Coherent set of global 0.25 degree, Ocean VC products
 - Integration with select in-situ datasets in support of Blue Planet and GEO-MBON applications
- Thematic portal technology platform providing seamless, integrated access to distributed datasets
- Leverage/Support for data interoperability standards
- Data discovery capabilities
- Advanced Web-based visualization interface allowing interactive overlay of data layers and dynamic animation
- Value Added Services
 - Subsetting /extraction
 - Collocation/matchup
 - On demand processing capabilities (e.g. trend analysis, anomaly detection, regridding)

OVERVIEW

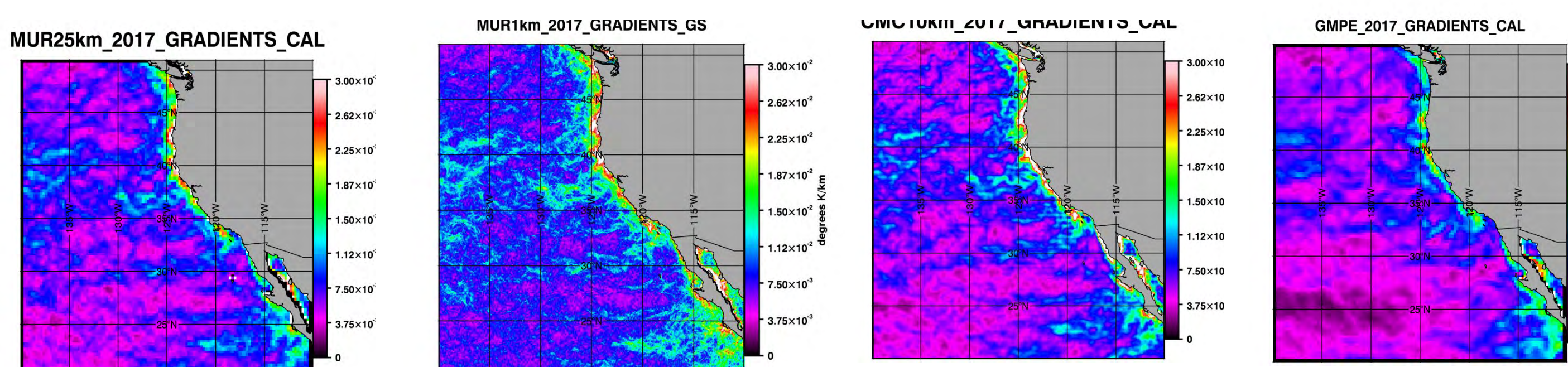
- Origin: CEOS – SIT meeting in Pasadena in 2013
- COVERAGE aims to assemble and present satellite and in situ ocean data in a compelling web-based format to demonstrate the value added of multivariate ocean data integration in support of science, applications, and public engagement.
- Tech. Platform for integrated ocean data access: “fusion environment” for multi-parameter observations, available in near-real-time, collocated to a common grid, thematically organized, including climatologies, and allow for inclusion of emerging in situ data sets (e.g. AIS ship tracking, animal tagging, etc.).
- Build a project to bring together 4 CEOS Ocean Constellations (SST, Ocean Color, Ocean Vector Winds, Ocean Surface Topography), enable broad international participation, enable widespread use of ocean satellite data, and utilize emerging data management and cloud capabilities.
- Broader Vision: International collaboration via CEOS engagement for global extension of COVERAGE involving real-time implementation and a priority-set of use cases. Spinoff is the a global product with near-real-time capabilities.

GOALS

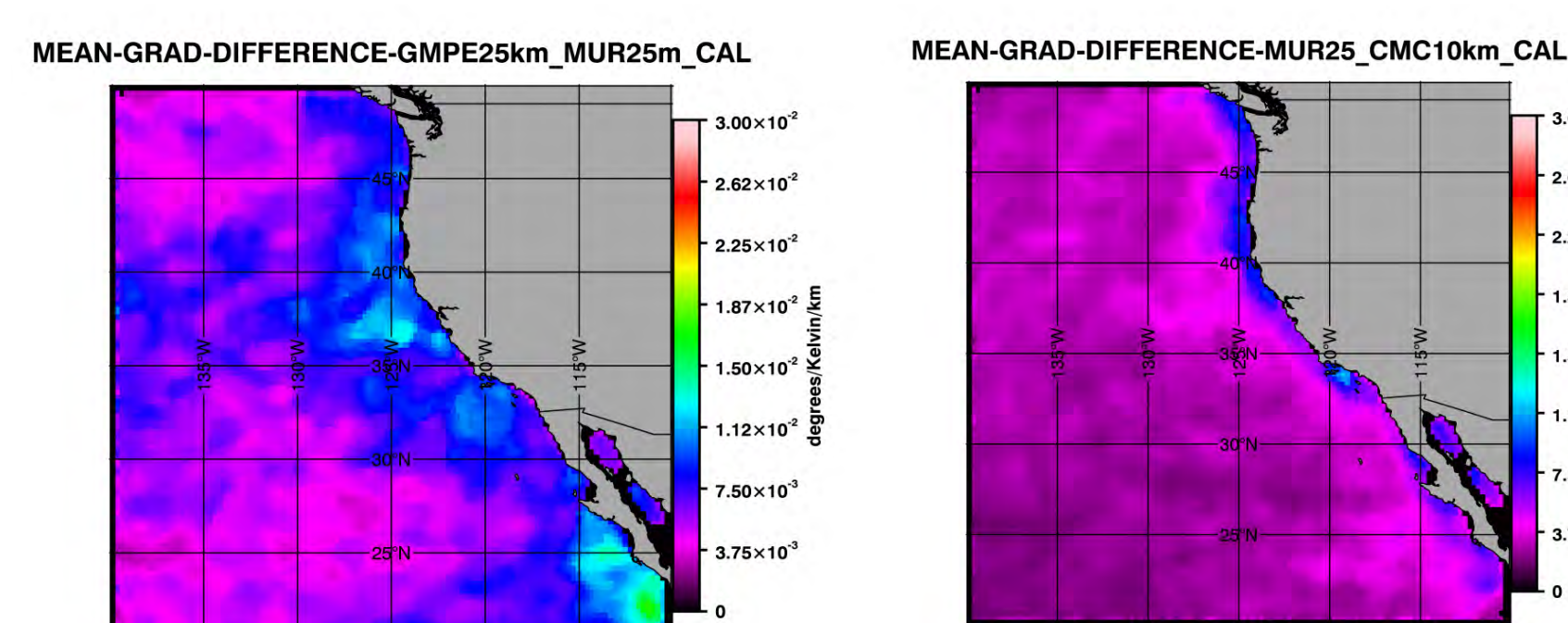
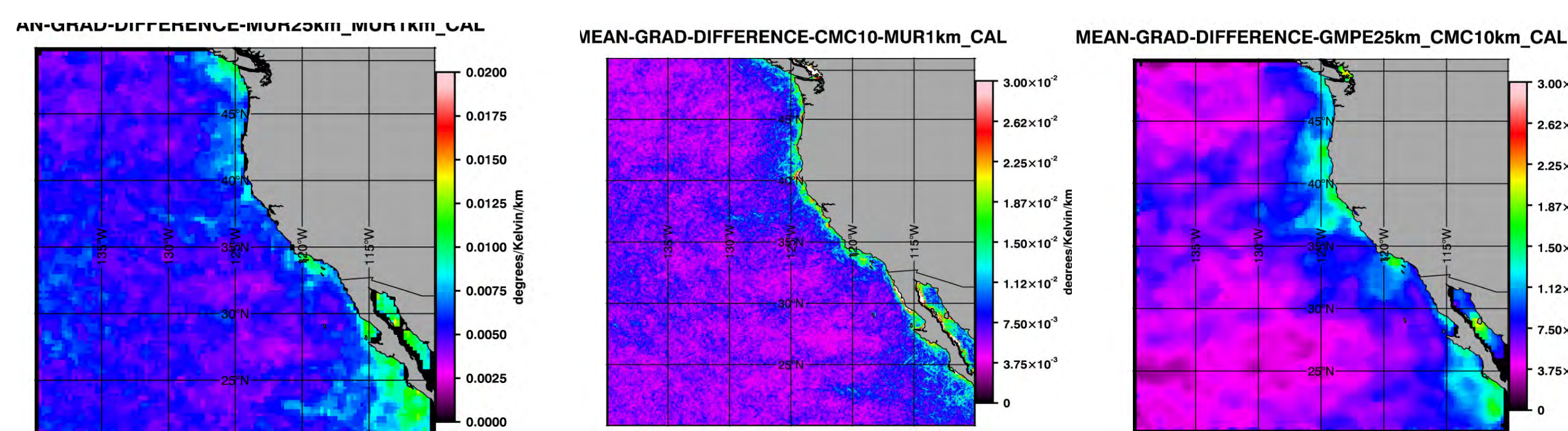
- Develop a data rich platform for delivery and access to integrated, analysis ready ocean data:
 - Multi-parameter observations, easily discoverable and usable, thematically organized, available in near real-time (where possible), collocated to a common grid and including climatologies.
 - Complemented by a set of value-added data services available via the COVERAGE portal including
 - Community & Use Case Driven
 - Leverage relevant existing/emerging technologies (several open source) and a successful project implementation model (e.g. NASA Sea Level Change Portal)
 - Open Source Software
- Do this collaboratively with participation of other interested CEOS agencies

Sea Surface Temperature Comparisons: GMPE 25km, CMC 10km, MUR 25km and 1km

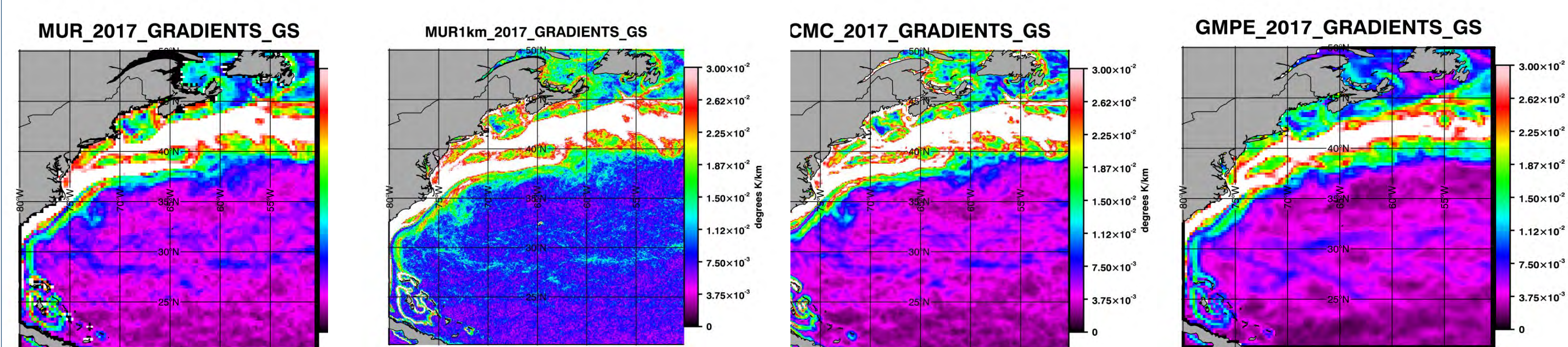
California Current: Mean SST Gradients for 2017



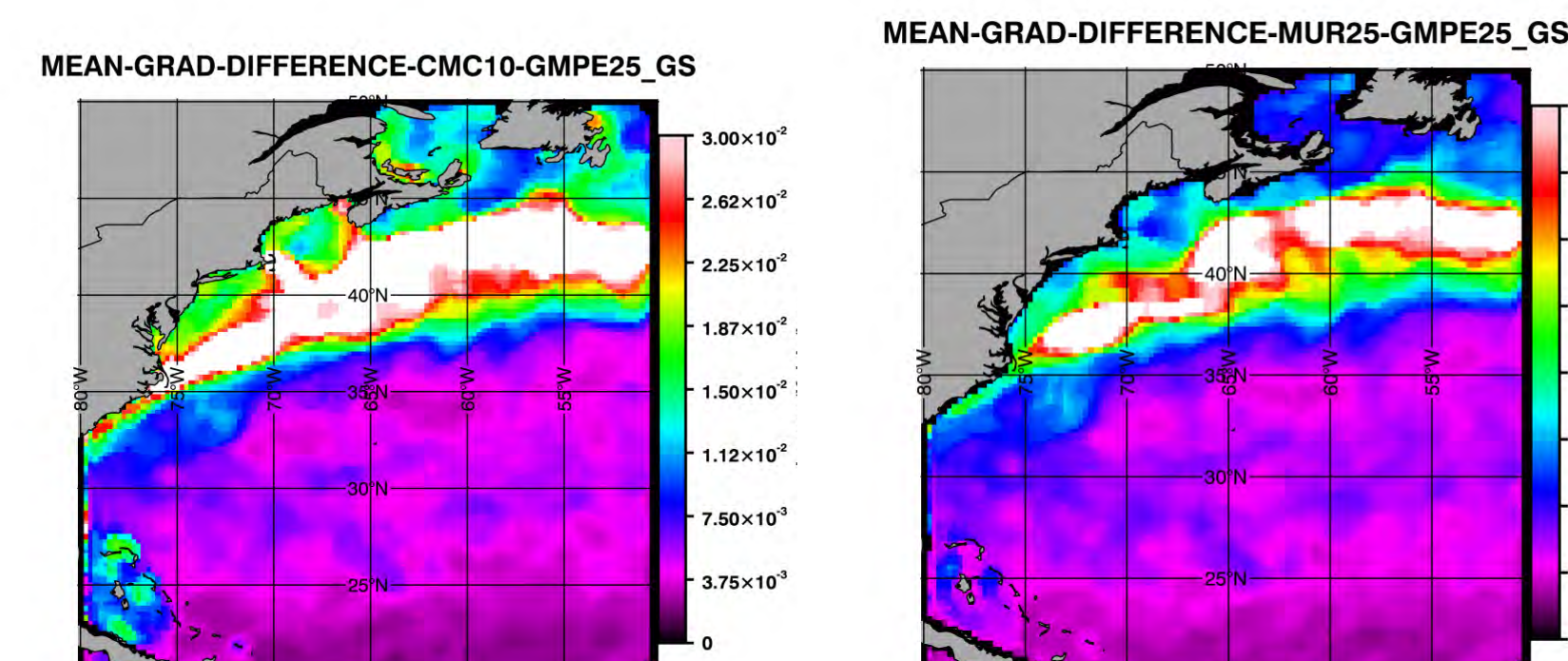
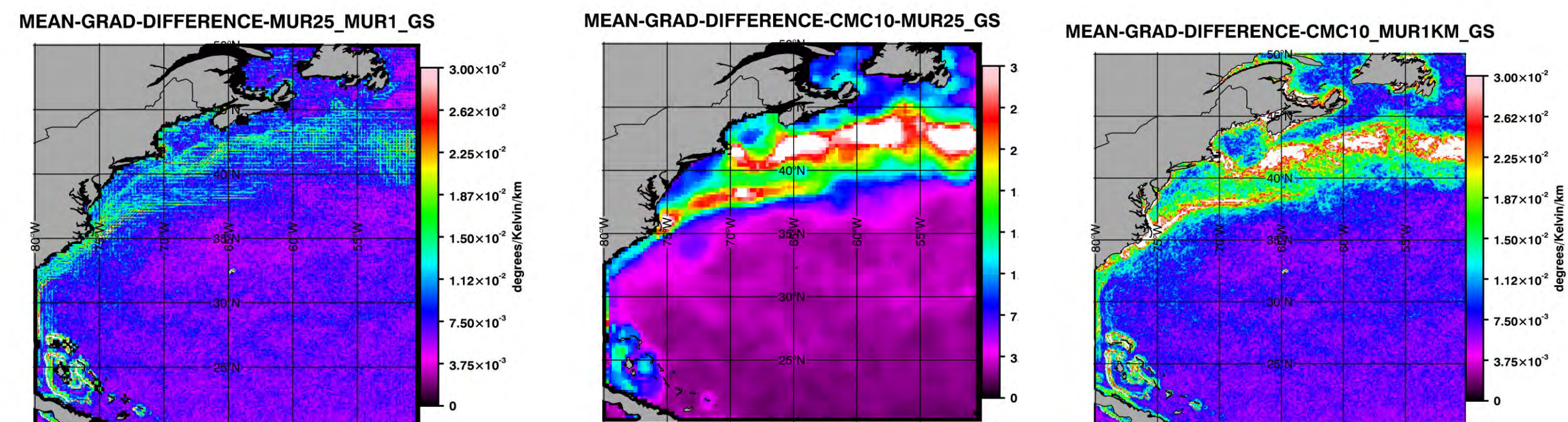
Mean Differences of SST Gradient for 2017



Gulf Stream: Mean SST Gradients for 2017



Mean Differences of SST Gradients 2017



Project Status

- COVERAGE initiative endorsed at CEOS-SIT32 (April 2017)
- COVERAGE Phase A project funded with NASA PO-program support (3-yr commitment)
- Cross-CEOS Agency Advisory Board Formulated with quarterly engagements
- Detailed inventory of candidate data sets to be implemented within COVERAGE undertaken
- Use case/requirements formulation and COVERAGE system architectural design ongoing

Conclusions

Comparisons of different SST, MUR at two resolutions, 25 km and 1km, GMPE, and CMC indicates that for coastal applications of SST careful consideration needs to be given to not just gridding resolution, but also to the spatial representation of the data. Looking at gradients can provide a useful tool for comparisons and decision making on the applicability of the SST data set.