

CROSS- VALIDATION OF SATELLITE DERIVED SST WITH DATA FROM BULARGO FLOATS

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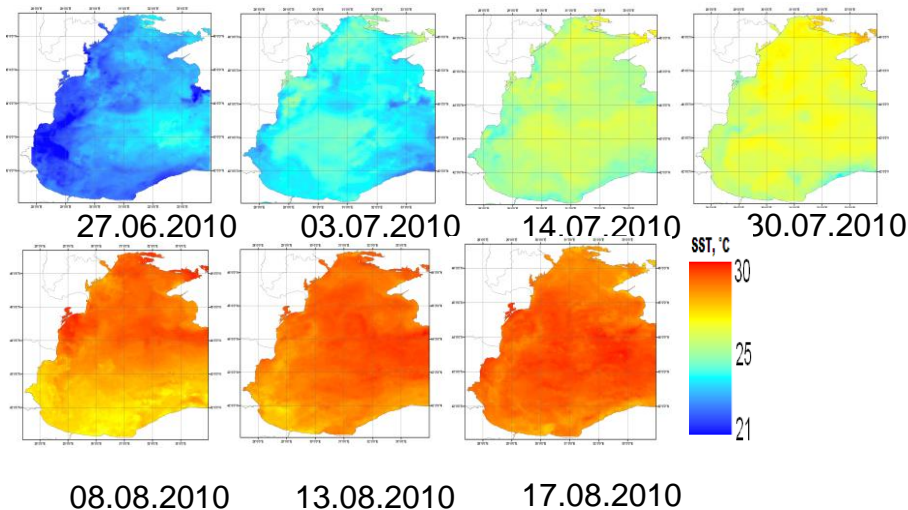
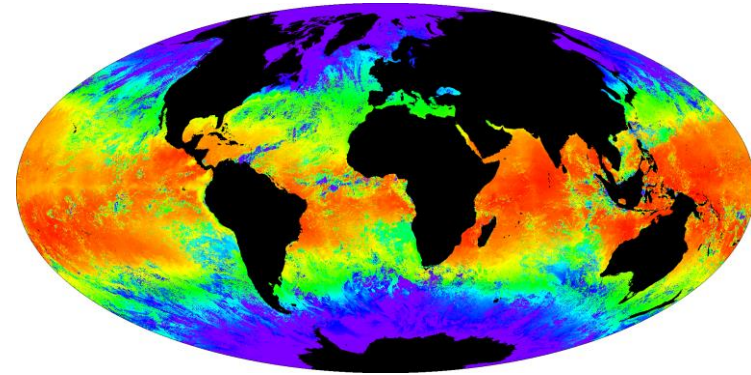
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Why we need SST data?

Sea Surface Temperature (SST) is an important geophysical parameter, providing the boundary condition used in the estimation of heat flux at the air-sea interface.

On the global scale, SST is essential for :

- climate modeling;
- study of the earth's heat balance;
- insight into atmospheric and oceanic circulation patterns and anomalies ;

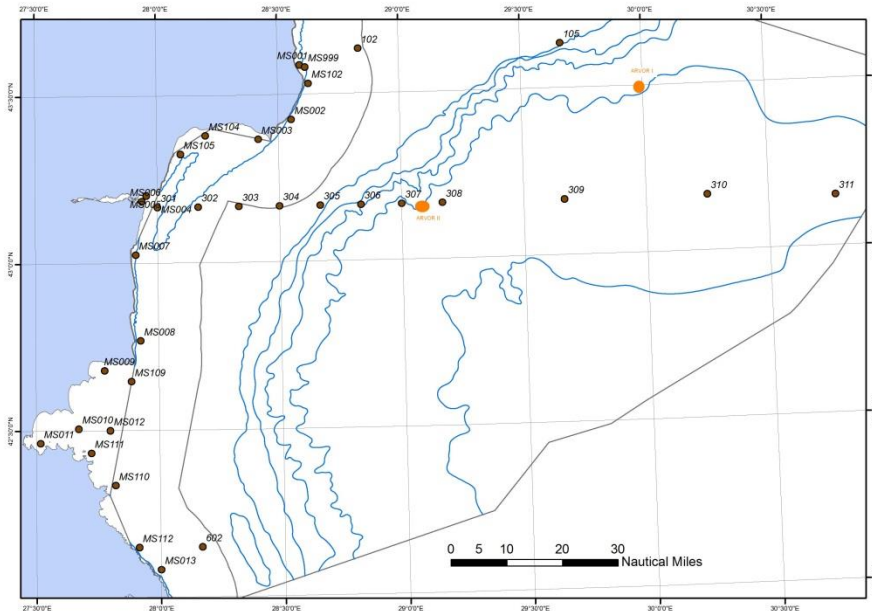


On a more local scale, SST can be used operationally to assess :

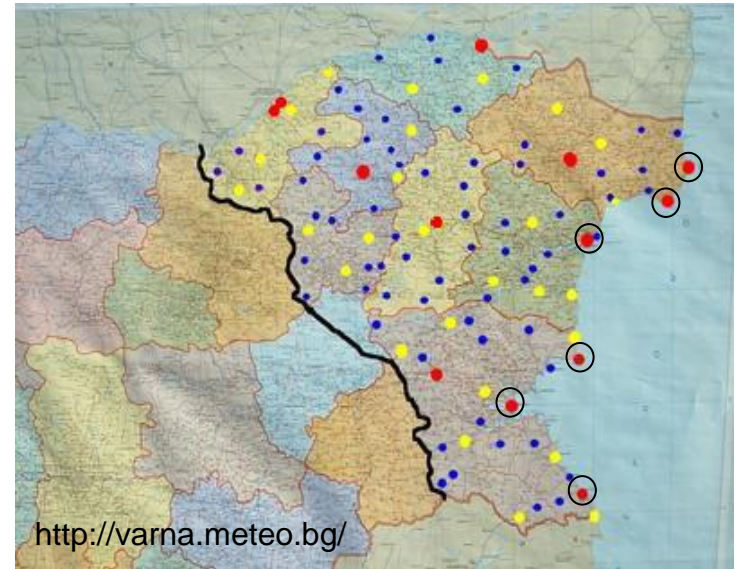
- eddies, fronts and upwellings for marine navigation;
- track biological productivity;

Lack of SST data in the BS

- ✓Spatially limited SST measurements from coastal stations operated by National Institute of Meteorology and Hydrology - BAS;
- ✓Irregular oceanographic cruises;



Bulgarian Black Sea monitoring network

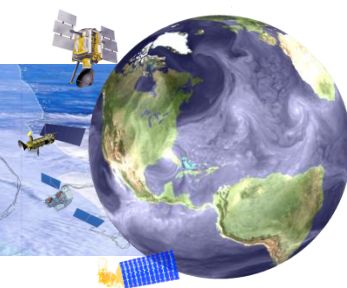


<http://varna.meteo.bg/>

Bulgarian coastal synoptic station network

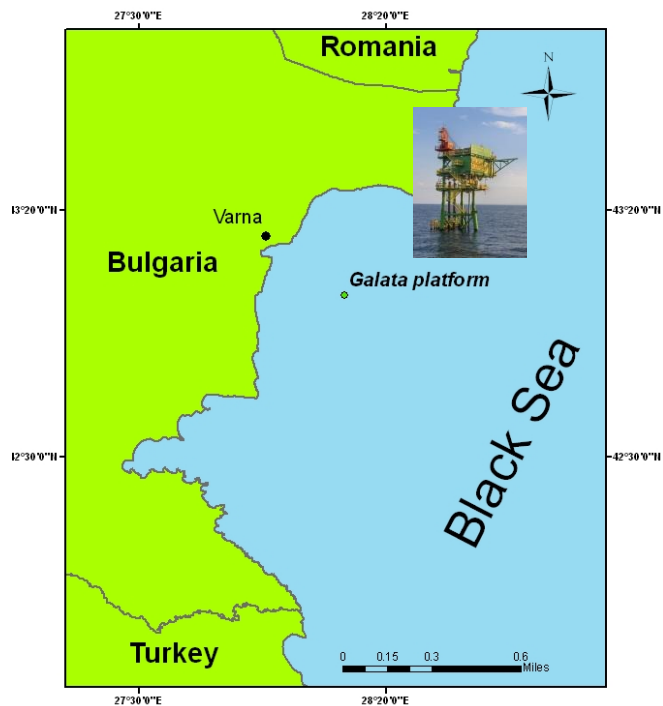


Sources of Operational SST data



✓“Galata - Real - time weather and sea state observing system”

✓Port Operational Marine Observing System (POMOS)

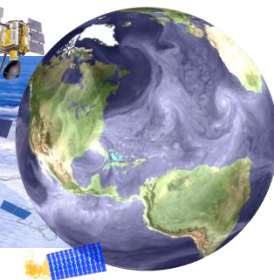


Galata

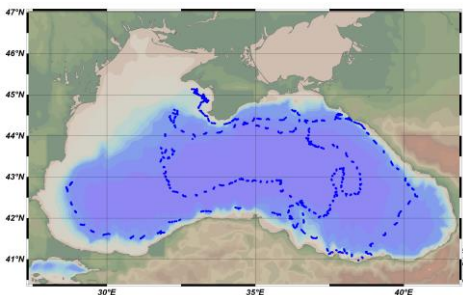


POMOS

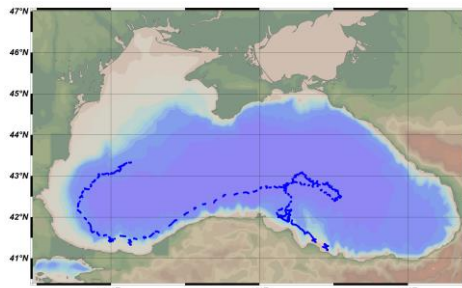
And since December 2009 data from



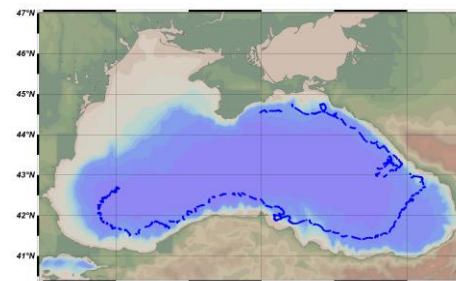
➤ARGO Floats



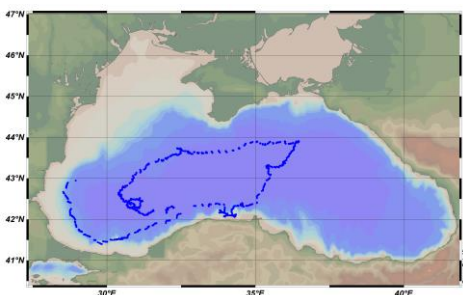
Kaliakra, #1901200



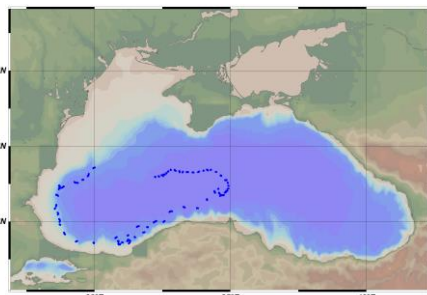
Shabla, #9600804



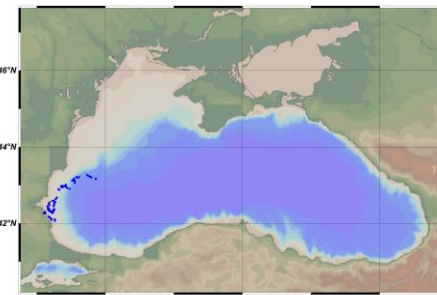
Emona #9600804



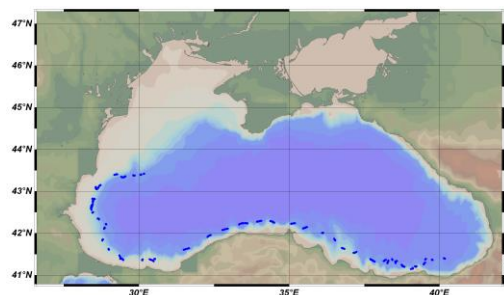
Galata, #9600804



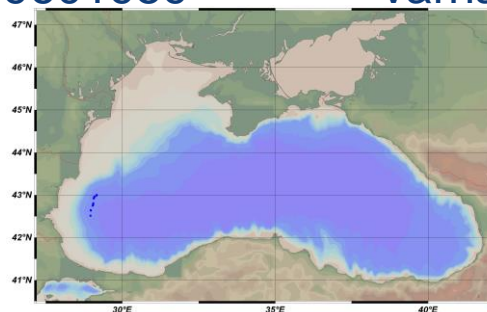
Rusalka, #9601959



Varna, #9601960



EliTo, #9601961



Kamchia, #7900590

To overcome these limits of traditional measurements

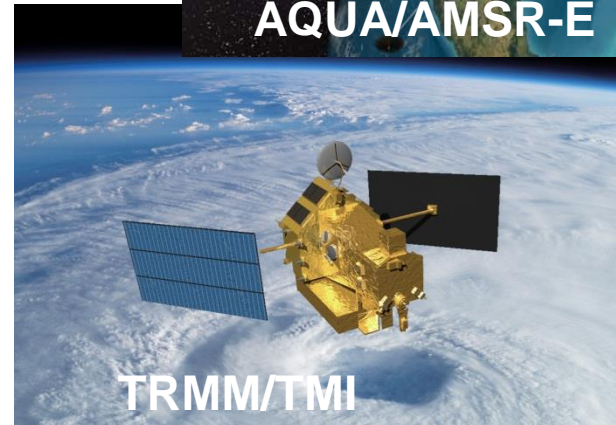
Satellite-derived SST has received considerable attention as a complementary data source because of its high spatial and temporal resolution and wide coverage. Satellite-derived SST data still need to be validated to confirm that SST data generated from remote sensors can be used for more general applications.



NOAA/AVHRR



AQUA/AMSR-E



TRMM/TMI

Satellite SST Data

Data set: (1) AMRS-E/ Aqua SST product

Period: December, 2009 – December 2011

Type: Daily Level-2B SST retrievals at 0.25 deg (~25 km) sampling.

Total images: 202

Source: <http://remass.com>

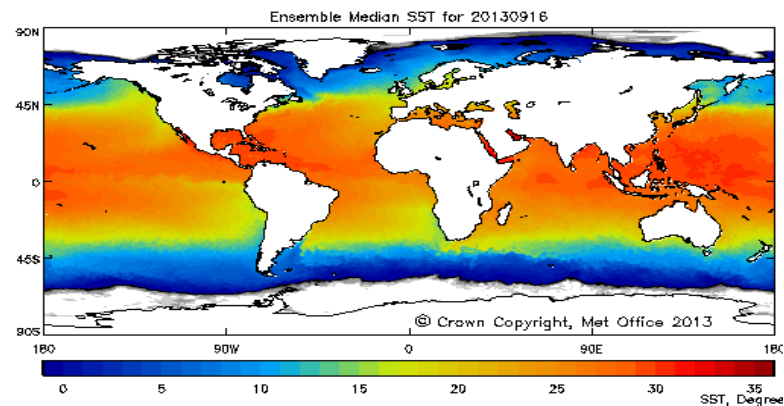
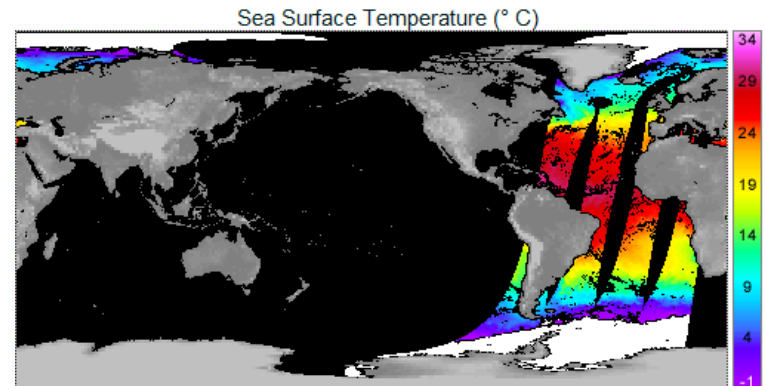
Data set: (2) GHRSSST (merged AVHRR/NOAA &MODIS/AQUA и AMRS-E/AQUA SST data)

Period: December, 2009 – February 2013

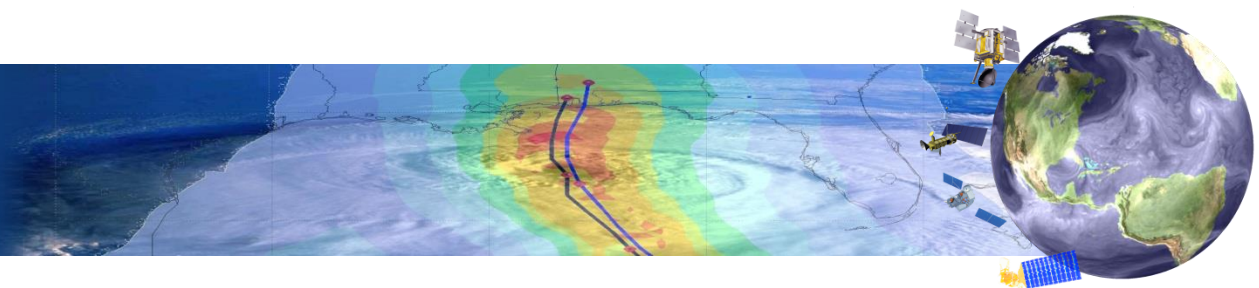
Type: Daily L4 gridded SST products with 0.05 deg products

Total files: 436

Source: <http://ghrsst.org>



ARGO Data



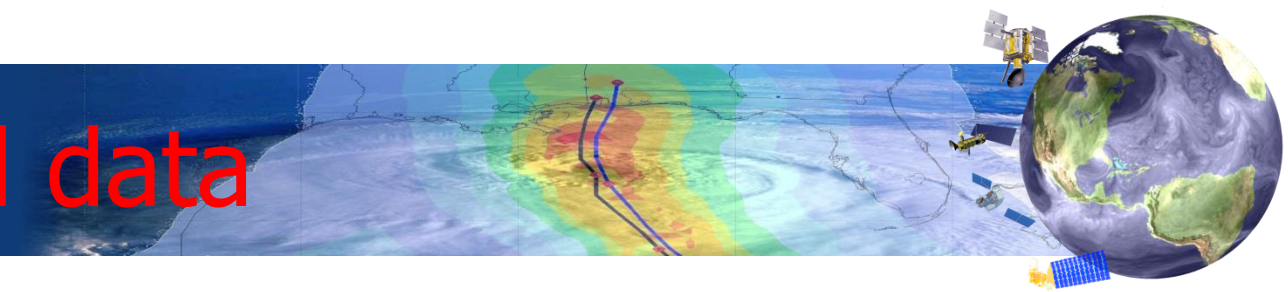
Data set: (3) Near surface Argo SST data (0-5m) after DMQC for the period Dec. 11, 2009 ~ Jan. 28, 2013

Argo ID	WMO	# Profiles
Kaliakra	1901200	232
Shabla	6900803	138
Emona	6900804	140
Galata	6900805	140
Rusalka	6901959	50
Varna	6901960	26
EliTo	6901961	20
Delphin	6901962	36

Total: 782



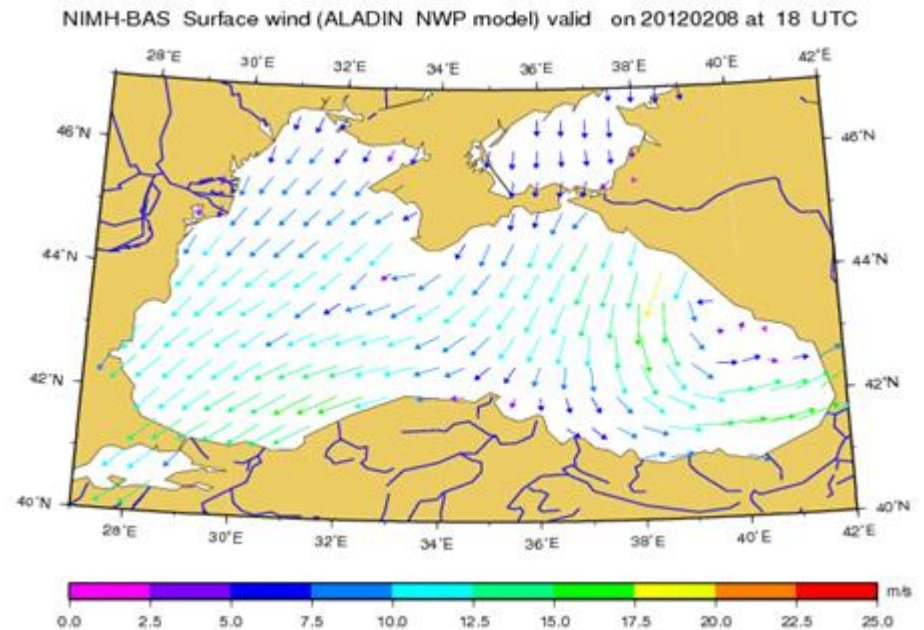
Wind speed data



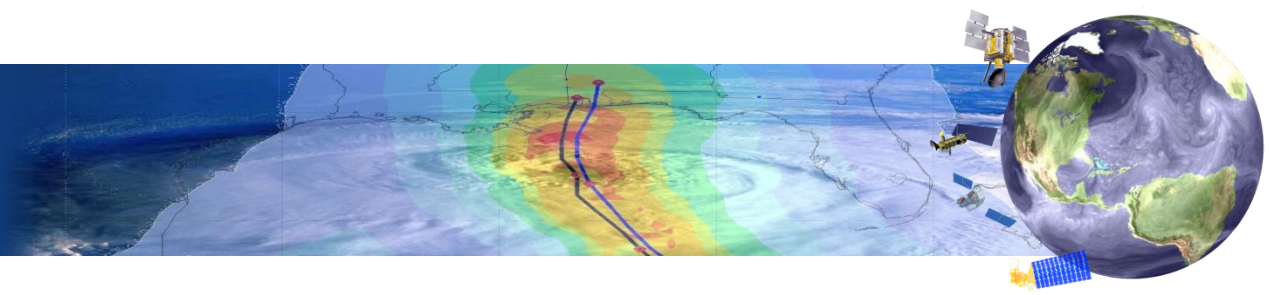
Data set: (4) Wind speed data from ALADIN model (limited area spectral model for regional forecast of meteorological fields)

Period: December, 2009 – February 2013

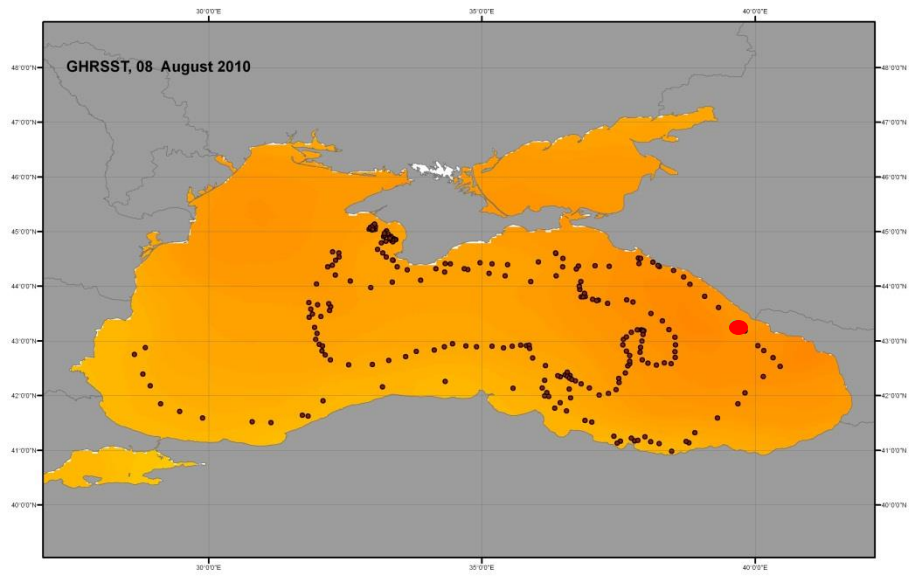
Type: The wind fields are available at 3-hour intervals on a regular latitude-longitude grid with a $0.125^\circ \times 0.125^\circ$ grid resolution



Method:

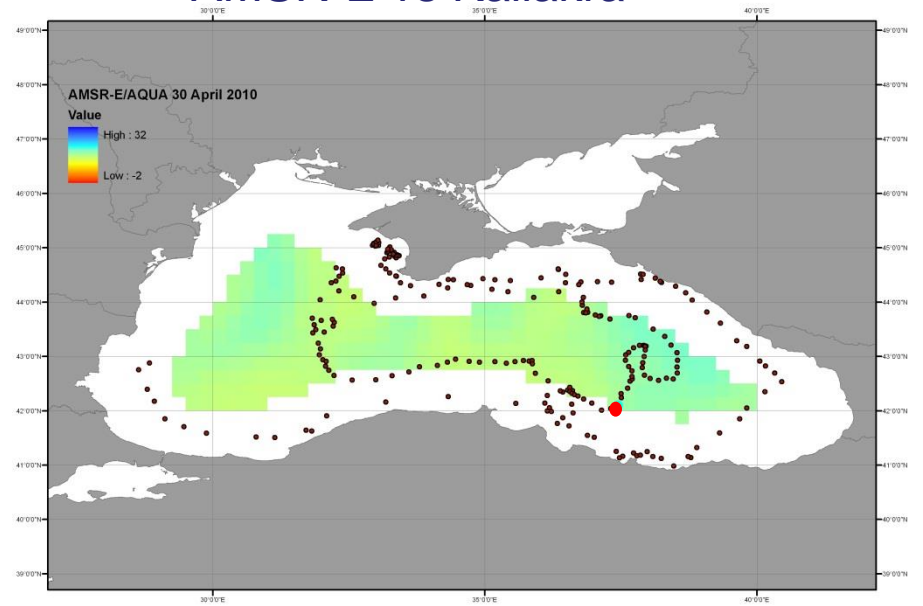


GHRSSST vs Kaliakra



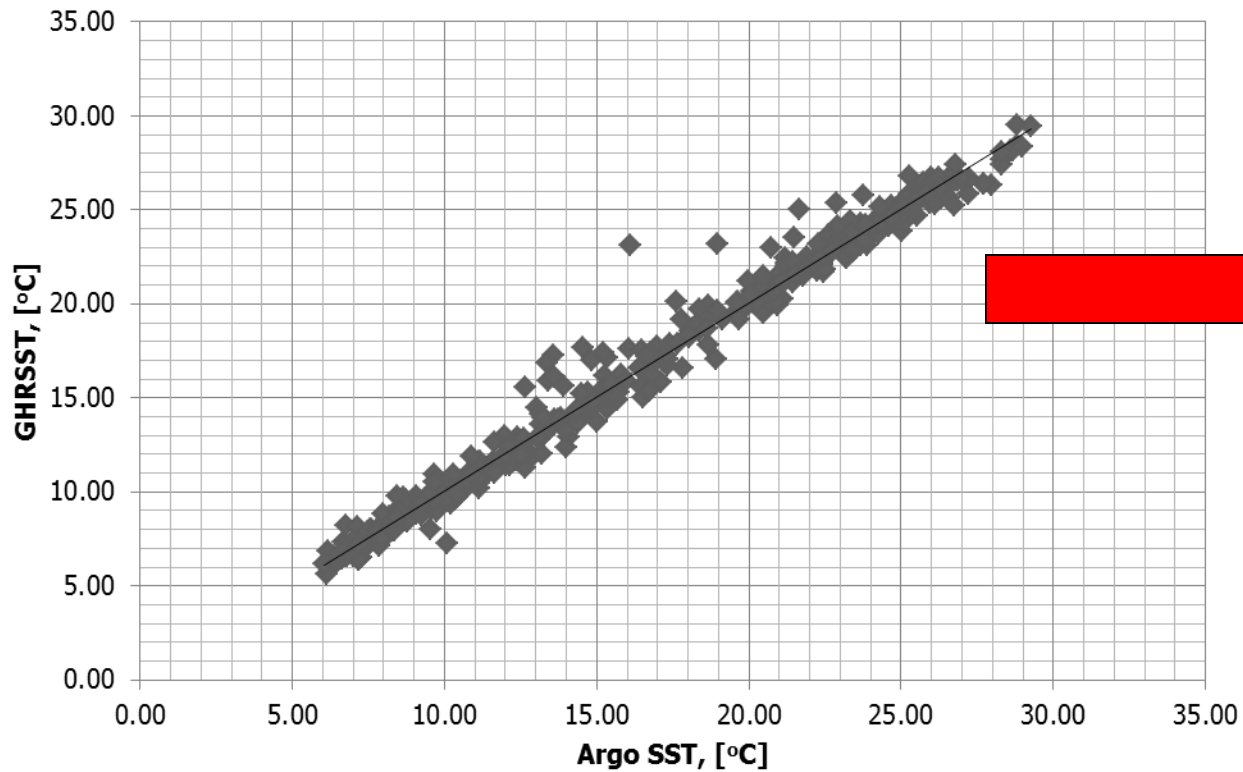
Co-location (in time and space)
satellite SSTs and Argo
measurements

AMSR-E vs Kaliakra



Results

GHRSSST vs Argo

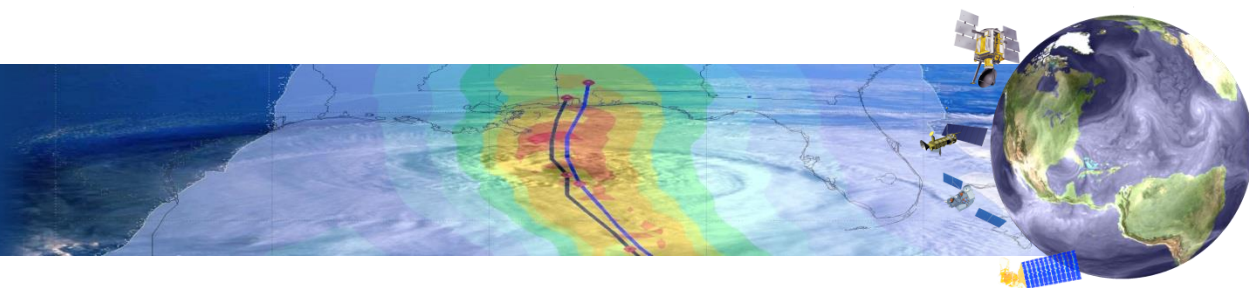


RMS = 0.39 °C

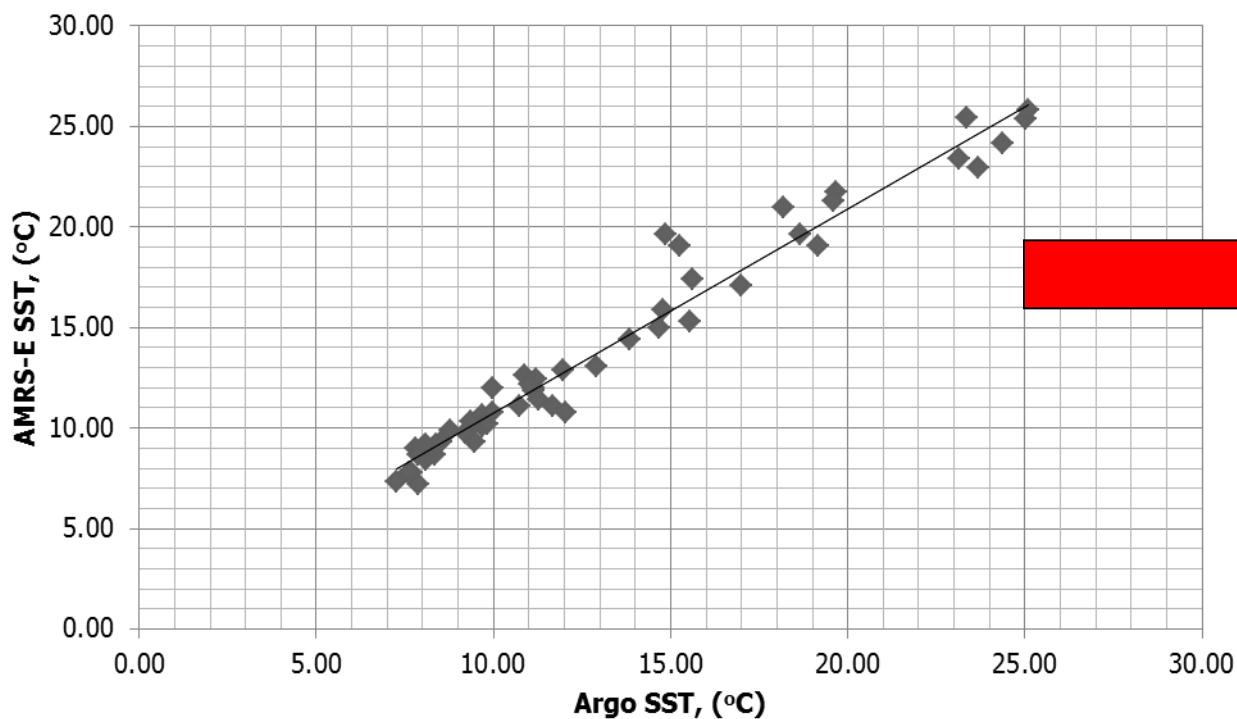
$R^2 = 0.98$

N = 482

Results



AMRS-E vs Argo

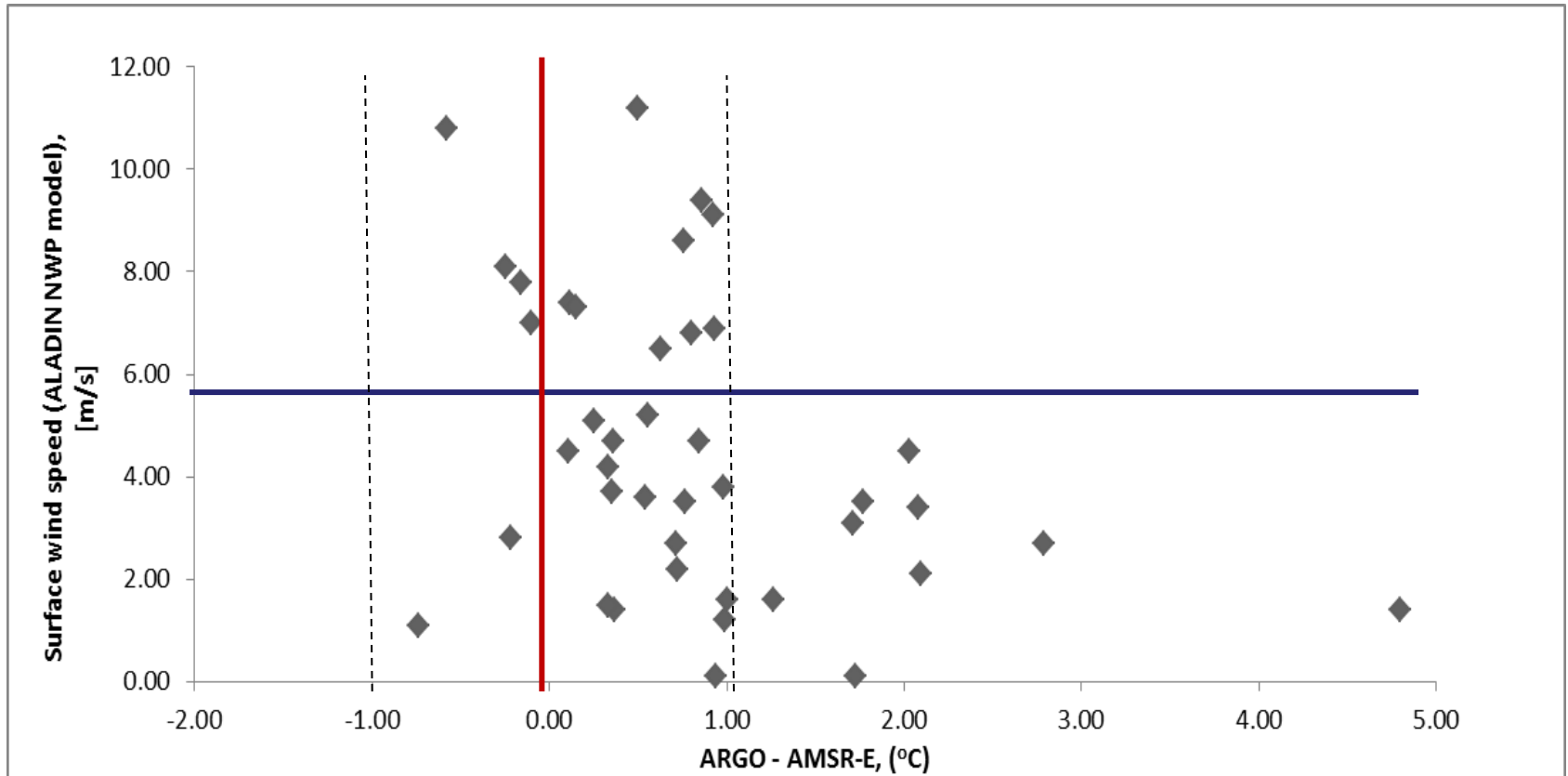


RMS = 0.65 °C

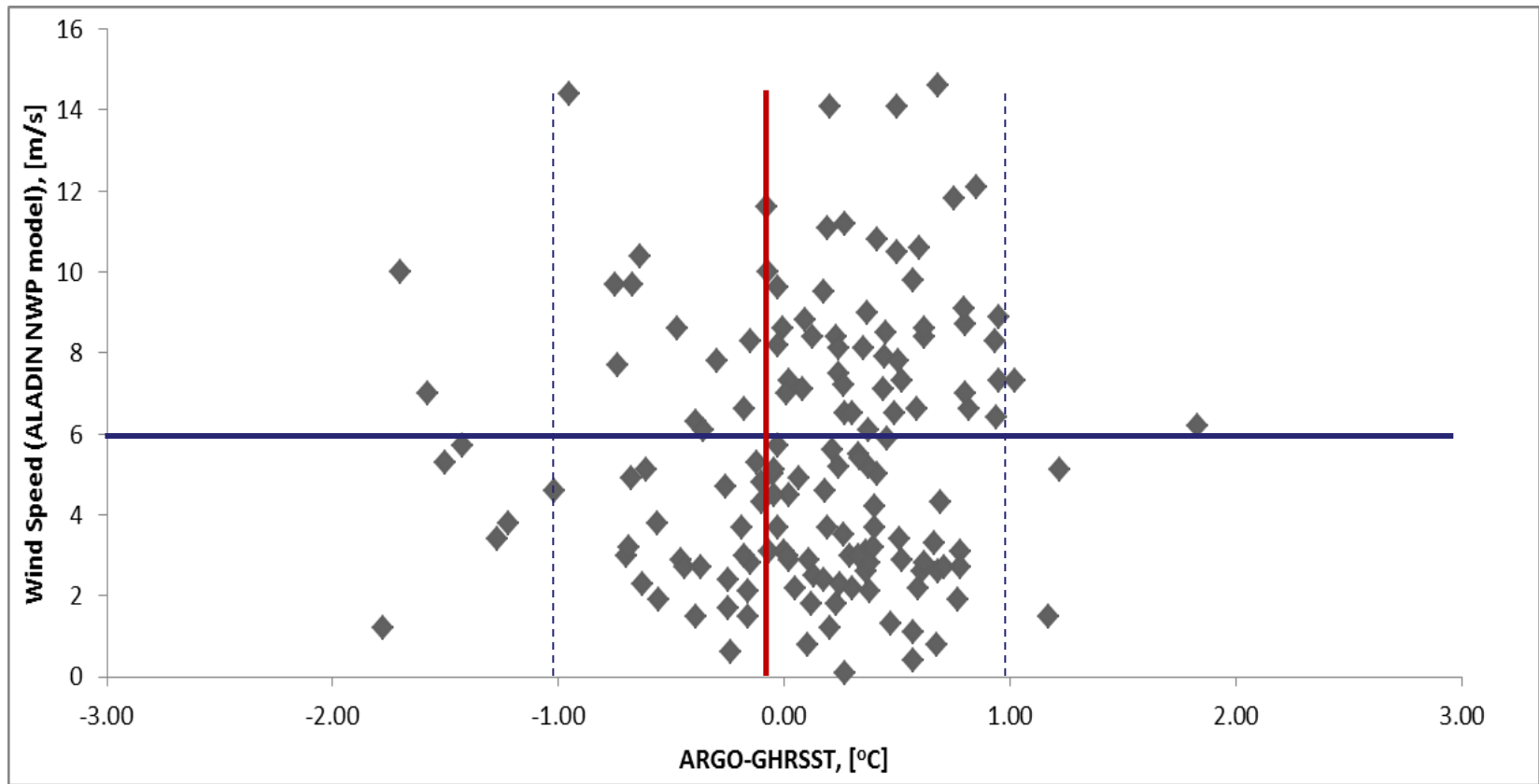
$R^2 = 0.94$

N = 53

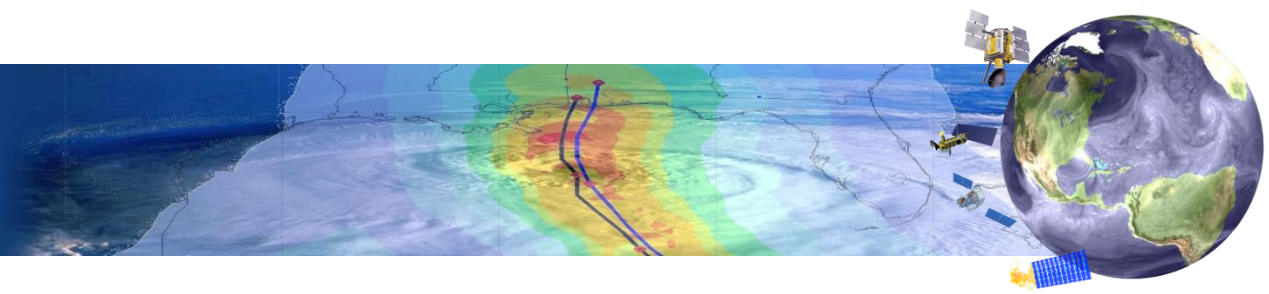
Relationship between wind speed and difference SST between ARGO & AMSR-E



Relationship between wind speed and difference SST between ARGO & GHRSSST



Conclusion



The validation of the satellite SST datasets from microwave and infrared sensors with Argo data can be considered as successful and the derived data reliable for further use and applications in various scientific researches and marine activities in the region.



Thank you