DART meteorological measurements - March and August 2006

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Introduction

DART (Dynamics of the Adriatic in Real-Time) is a project devoted to real time observational and modeling study of the Adriatic Sea involving a considerable number of organizations from Europe and US. Several ocean and wave models were run using different meteorological model outputs for atmospheric forcing. Two field campaigns (research cruises) were organized, during March and August 2006. This poster presents the meteorological measurements obtained during DART field campaigns.

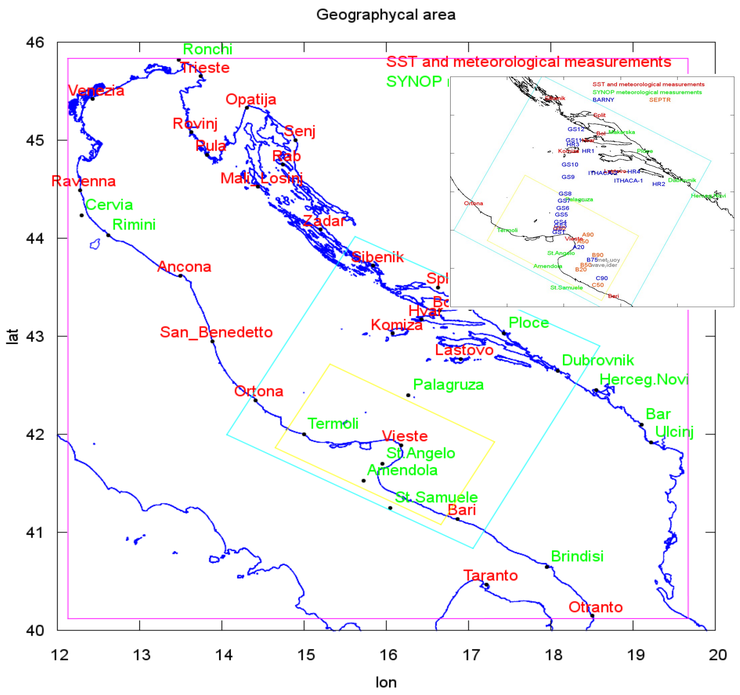


Figure 1: The geographical area of interest with SYNOP stations. The positions of oceanographic measurements and the meteorological buoy are shown in the embedded figure.

SYNOP measurements

Data from Croatian SYNOP stations were provided hourly, the data from Italy and Montenegro 3-hourly as available in GTS. The measured data from land meteorological stations was provided by CMHS and transferred to a server on NRV Alliance in real time. It was used for validation of meteorological forecast on board.

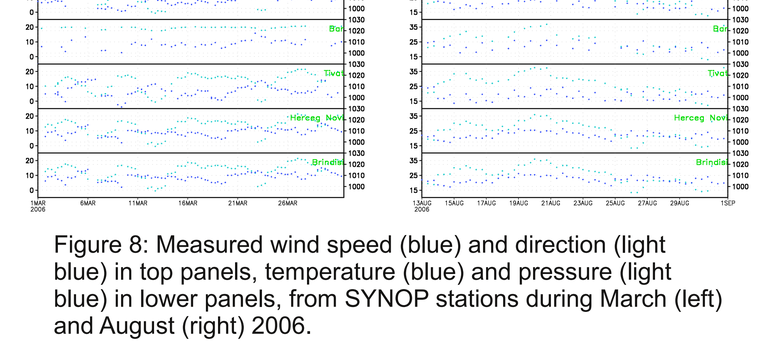


Figure 8: Measured wind speed (blue) and direction (light blue) in top panels, temperature (blue) and pressure (light blue) in lower panels, from SYNOP stations during March (left) and August (right) 2006.

Sea temperature measurements at Croatian stations

The temperature of the sea 1m below surface is measured on a number of meteorological stations in Croatia three times a day, at 06, 13 and 20 UTC.

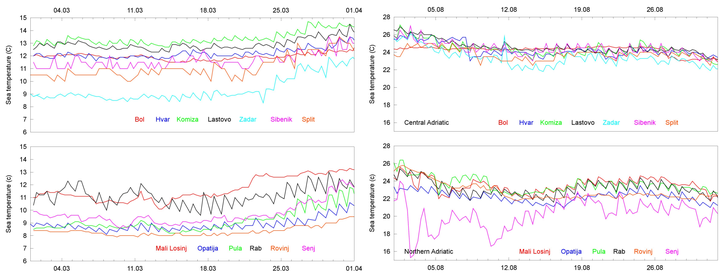


Figure 9: Measured sea temperatures at Croatian stations during March (left) and August (right) on northern (lower panels) and central (upper panels) Adriatic. Colder sea temperatures in Senj during August are a consequence of strong nocturnal wind from shore.

Figure 2: NRV Alliance at peer in La Spezia. The positions of automatic meteorological instruments are shown with arrows. Embedded figures show the meteorological instruments, computer interface for the measurements, ship's radar echo of a cloud and Dallaporta ship involved in the experiment.

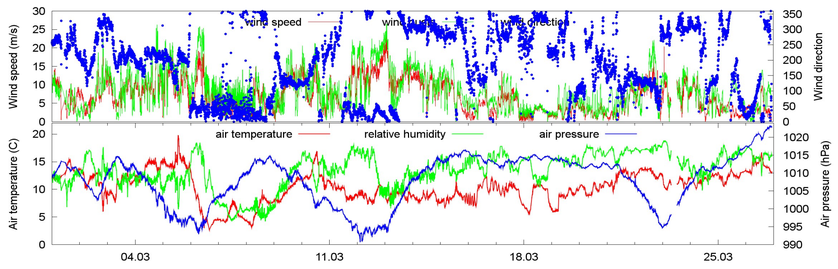
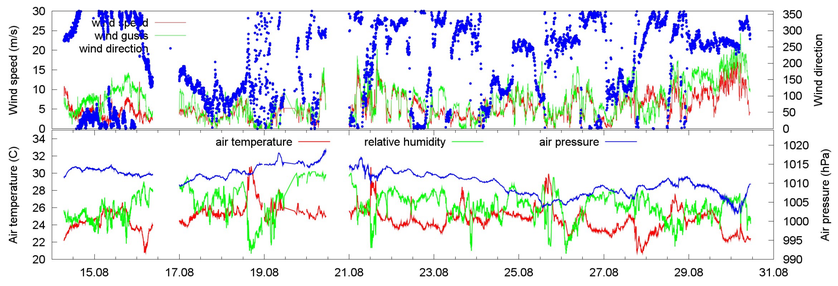
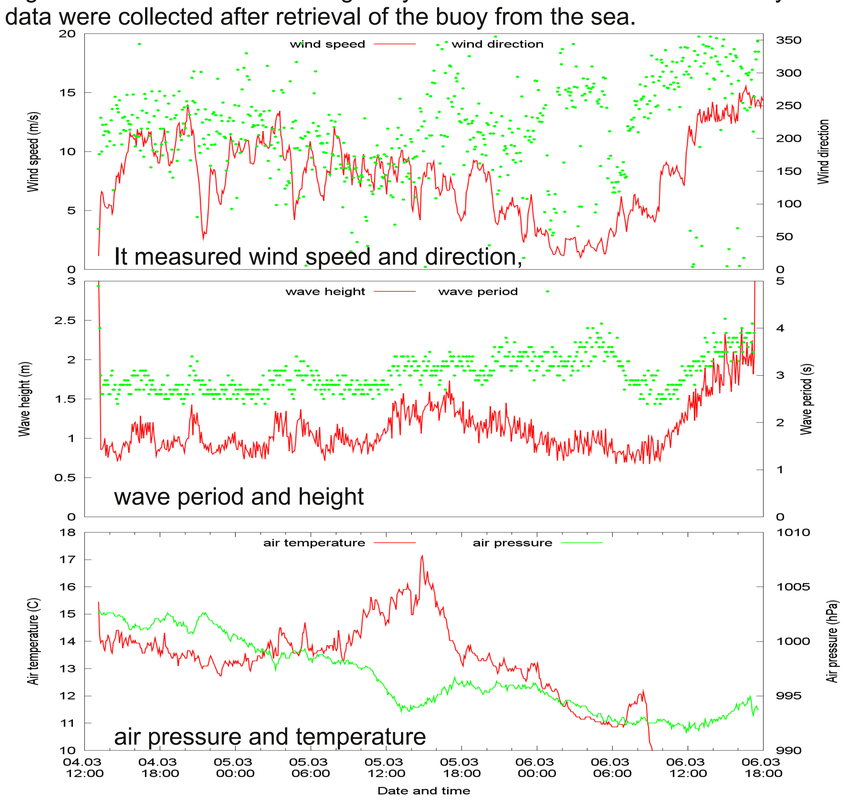


Figure 3: Meteorological measurements from the automatic station 2 (on the mast on ship's bow) during March (above) and August (below) 2006 cruises. The top panel shows measured wind speed (red), direction (blue) and gusts (green). The lower panel shows air temperature (red), humidity (green) and pressure (blue).



Meteorological buoy

Figure 6. The coastal monitoring buoy was anchored in Manfredonia bay. The data were collected after retrieval of the buoy from the sea.



SODAR measurements at Split airport

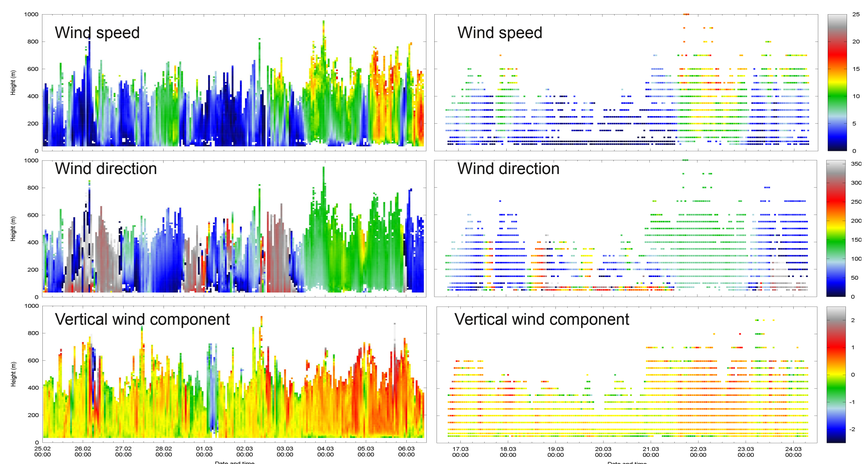


Figure 10. SODAR measurements of vertical profiles of wind field above Split airport were established before the March 2006 field experiment. The measurements of wind speed, direction and vertical component are available every hour at discrete levels as pre-set by the operator.

Meteorological measurements on board NRV Alliance

NRV Alliance is equipped with various devices for measurements of meteorological quantities. Two automatic meteorological stations were installed on a mast on the ships bow 23 meters above sea surface and one on the stern 15 meters above sea. The instruments measured wind speed, direction and gusts relative to the ship, air temperature, humidity, pressure and solar irradiance. The true wind speed and direction were computed in real time according to the ships speed and direction. The sea surface temperature and salinity were measured by a surface CTD. Additionally, there were “classical” meteorological observations performed by the crew from the bridge.

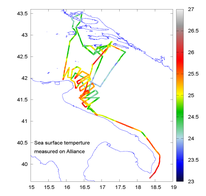


Figure 4: The geographical distribution of measured sea surface temperature from the ship (left). Sea temperature and salinity (bottom) measured during the August 2006 cruise. Extremely low salinity was measured in Split harbor.

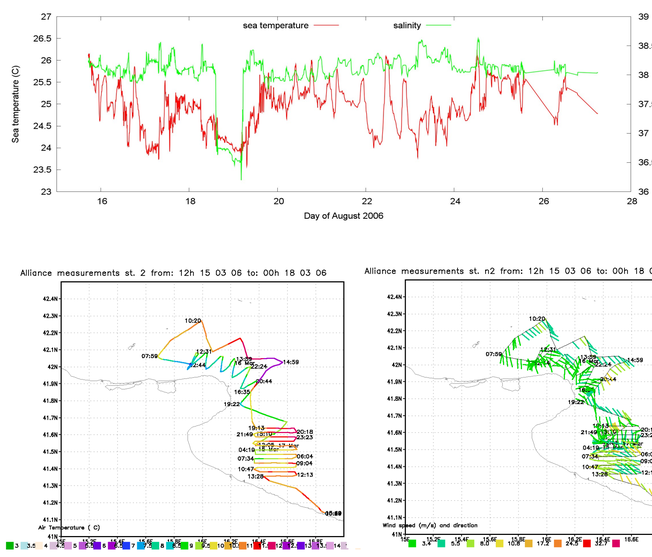


Figure 5: The geographical distribution of measured air temperature (left) and wind speed (right) from the mast at ship's bow from 12 UTC on 15th to 00UTC on 18th March 2006. The cold western Adriatic current has a profound effect on the air temperatures.

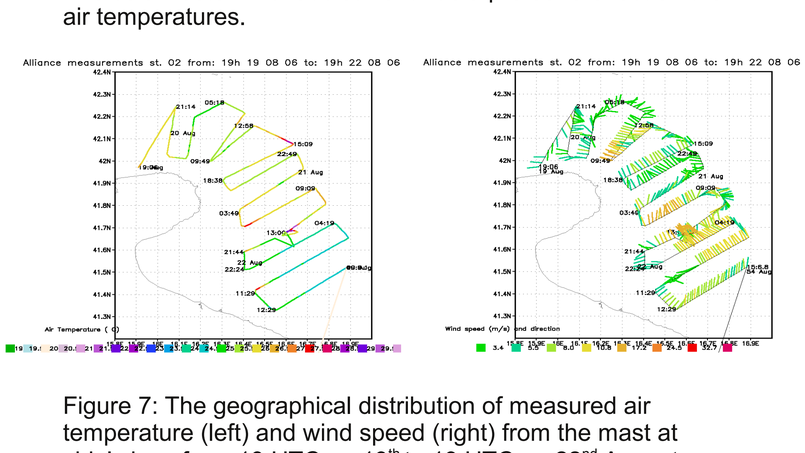


Figure 7: The geographical distribution of measured air temperature (left) and wind speed (right) from the mast at ship's bow from 19 UTC on 19th to 19 UTC on 22nd August 2006. Air temperature decreased after episodes of stronger NW wind, . It is difficult to distinguish the contributions of the sea surface and the ships surface to the temperature diurnal cycle.

Automatic meteorological stations

The data measured on the automatic stations in Croatia contains meteorological data measured with a fixed 10 minute interval. The number of measured meteorological parameters varies from one station to another.

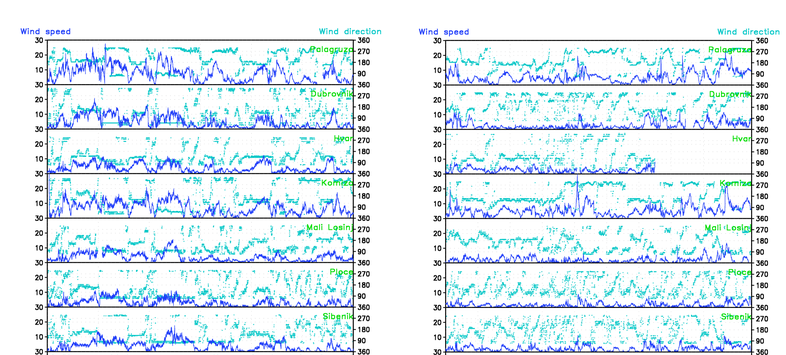


Figure 11: Measured wind speed (blue) and direction (light blue) during March (left) and August (right) 2006.

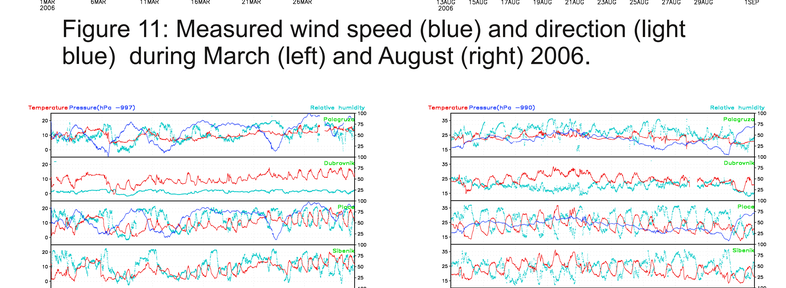


Figure 12: Measured temperature (red), humidity (light blue) and pressure (blue) on automatic stations during March (left) and August (right) 2006.