



FORM TO BE COMPLETED BY PROJECT LEADER

RESEARCH/TECHNOLOGY REPORT

REPORT NUMBER:

PERIOD COVERED: FROM 15/10/13 UNTIL 14/04/14 (DD/MM/YY)

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1. Project info

a) Project title:

Interpreting and forecasting Adriatic surface currents by an artificial brain (NEURAL)

b) Name of the Project Leader and Co-leader:

Ivica Vilibić Nedjeljka Žagar

c) Duration of the project (months) and type of the grant:

24 1B

d) Leading Organization (full name, address, and contact person details):

Institute of Oceanography and Fisheries, Šetalište I. Meštrovića 63, HR-21000 Split, Croatia, URL: <http://www.izor.hr>, contact: Ivica Vilibić, vilibic@izor.hr

e) Other organizations involved (full name, address, web address and contact person details):

University of Ljubljana, Faculty of Mathematics and Physics, Department of Physics, Chair of Meteorology, Jadranska 19, SI-1000 Ljubljana, Slovenia, URL: <http://meteo.fmf.uni-lj.si>, contact: Nedjeljka Žagar, nedjeljka.zagar@fmf.uni-lj.si

Meteorological and Hydrological Service, Grič 3, HR-10000 Zagreb, Croatia, URL: <http://meteo.hr>, contact: Martina Tudor, tudor@cirus.dhz.hr

2. Work plan and timetable of the project

a) Milestones (what and when is planned to be done)

please describe milestones realized; if not all the milestones are realized according to those stated in the original application form please explain why and what actions have

been taken to resolve problems encountered (use Tahoma 11, max 1500 words, add word count)

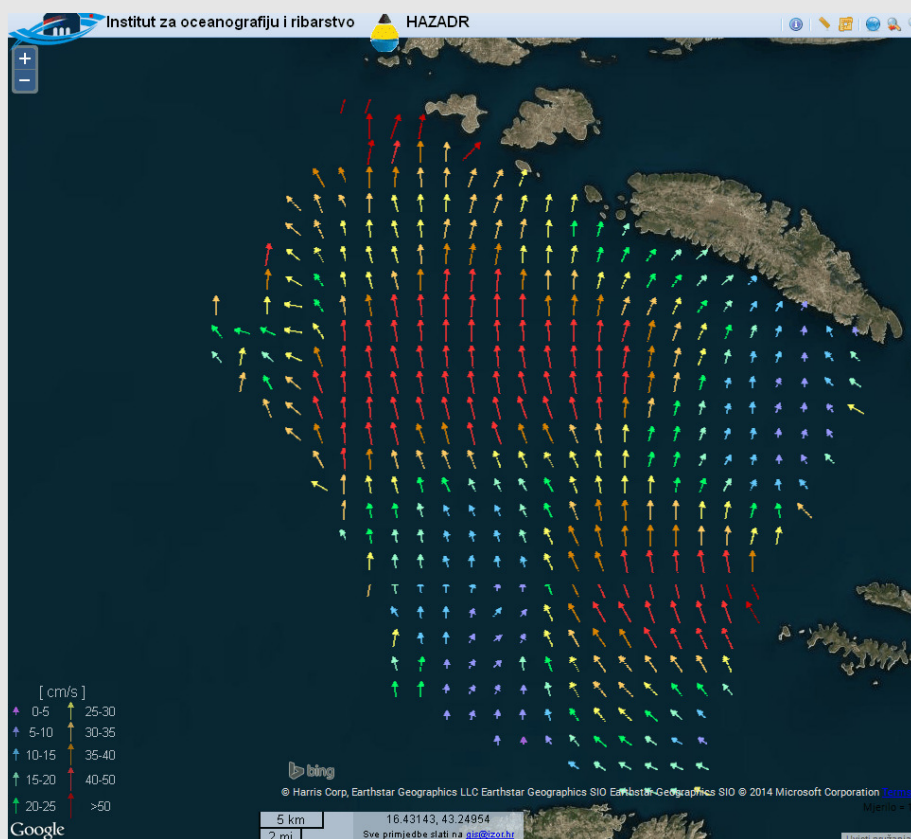
Word count: 917

The work plan and timetable of the project has been realized as planned. That particularly refers to Tasks 1 to 3, which are planned to be executed during the first 6 months of the project.

Task 1. Setup of operational procedures for the HF radar network.

Milestone 1. Operational procedures for HF radar network ready to use (month 4).

Through collaboration with the IPA Cross-Border Adriatic Programme funded project HAZADR (www.hazadr.eu), it was planned to purchase and install a pair of high-frequency radars in the area of middle Adriatic. The procedure for purchasing the equipment through the HAZADR project was initiated in the second half of 2013. The equipment was delivered to the institute in January 2014, while its installation at two sites, Cape Ražanj (island of Brač) and Cape Stončica (island of Vis) was carried out during second half of February 2014. The radars become operational in early March 2013, and the measured current fields are available at <http://jadran.izor.hr/hazadr>. Some communication problems still exist, which will be solved in the following period by upgrading data transfer capacity from the site to the data centre in the Institute.



Surface currents measured in the middle Adriatic on 25 March 2014 14:00 CET (available at <http://jadran.izor.hr/hazadr>).

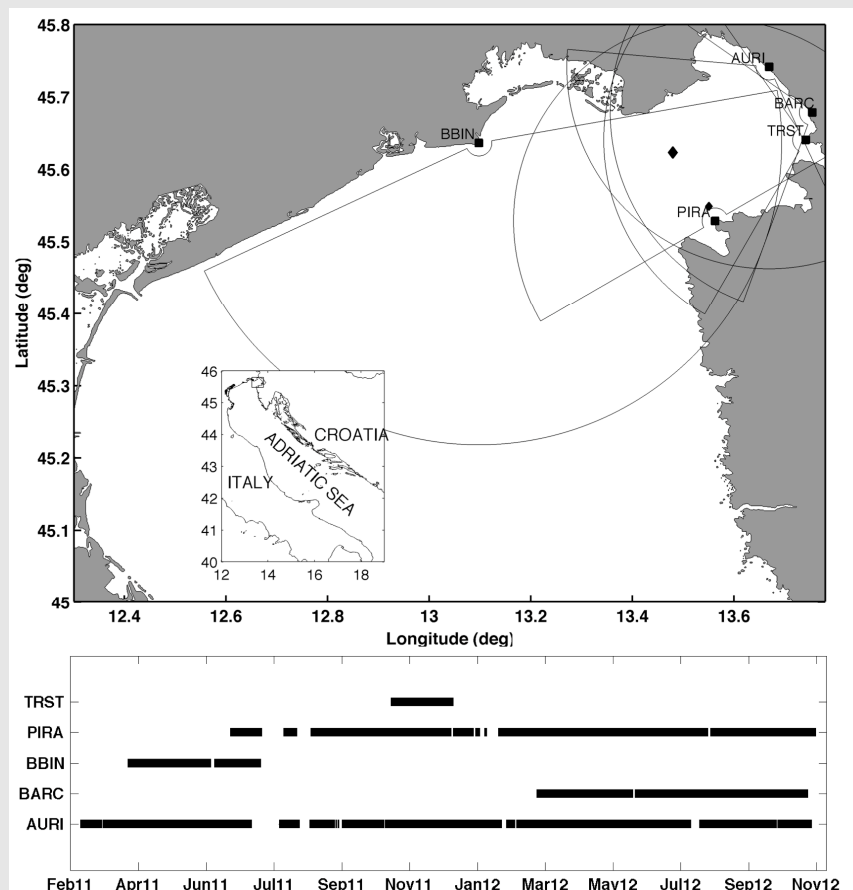


Task 2. High-level quality control of new and historic HF radar data.

Milestone 2. Historical hourly HF radar data from the northern Adriatic re-assessed through delayed-mode quality control procedures (month 6).

Historical surface current dataset collected in the northern Adriatic between 2007 and 2010 was collected, processed via the robust quality control procedures described by Cosoli et al. (2012). The dataset consists of surface currents gridded over the area, computed from radial (raw) data collected by three operating HF radar sites, Cove Savudrija, Zub and Bibbione. Such a dataset is extended version of the originally planned dataset, as additional available data was detected and processed with the respect of original project plan (2009-2010). In addition, the inclusion of additional project team member being an expert in HF radar data collection and processing, Simone Cosoli, allowed for project use of additional dataset collected within other cross-border programmes that were existing in the Gulf of Trieste in 2011 and 2012 (several HF radars sites were operating at that time), so our dataset was extended to 2011 and 2012.

Furthermore, a discussion on data analysis approaches carried out at the kick-off meeting introduced a possibility of inclusion of original radial HF radar data series to the SOM analyses and their intercomparison to the results performed on already processed HF radar data. The preparation of these data was initiated in this reporting period and will be finished in month 7. Such an analysis will allow for quantification of validity of procedures applied within the planned forecasting system.



HF radar stations and their data availability in 2011 and 2012, not originally considered by the NEURAL project.

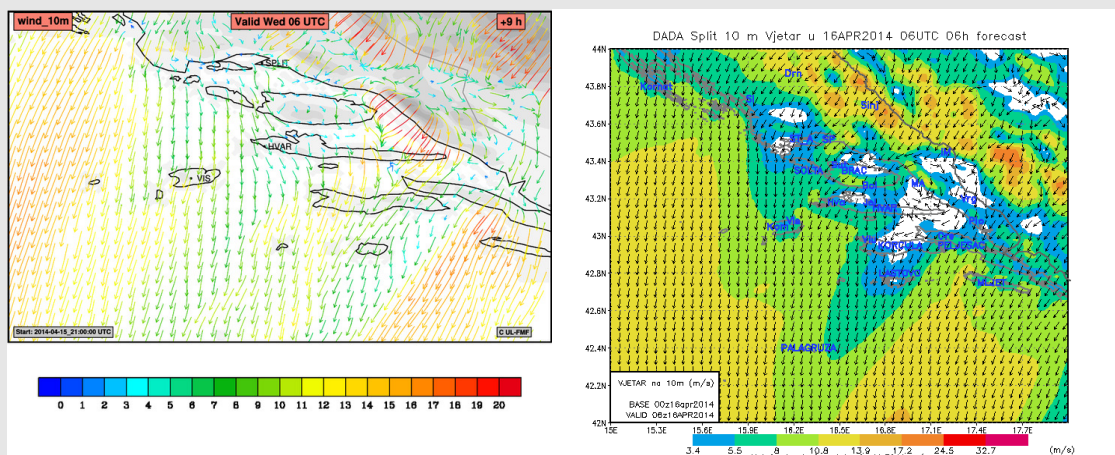
Task 3. Mesoscale reanalysis and forecast of the atmospheric fields by Aladin/HR and WRF-ARW models.

Milestone 4. Aladin/HR surface model fields available for the northern Adriatic area (month 6) and middle Adriatic area (month 14) covered by HF radar measurements.

According to the work plan, the reanalysis of the high-resolution Aladin/HR operational model was performed between July 2007 and December 2012, and the hourly wind data was provided over the northern Adriatic area on 2 km grid resolution. This action required an extensive computational time, which were provided by the project partner, Meteorological and Hydrological Service of the Republic of Croatia. These data will be used in next few months as input to the SOM analyses, together with surface current data measured by HR radars.

In addition to the work performed to reach milestones in the first six months of the project, a noteworthy work has been done on other proposed actions and tasks that have milestones in the following reporting periods. Namely, WRF-ARW modeling system is installed and become operational at the Co-PI institution (see <http://meteo.fmf.uni-lj.si/NEURAL>), providing operational wind forecasts for the middle Adriatic area (Milestone 5).

In the coming period a systematic evaluation of the winds over the central Adriatic simulated by the two forecasting systems will be carried out in order to detect model deficiencies and possibilities for improvements. An example show in figure illustrated significant differences in the simulated bora intensity on 16 April 2014, especially in the Makarska region.



Surface wind forecast from the WRF model (left) and operational ALADIN model at the national weather service (right). Both forecasts are valid at 6 UTC (8 o'clock local time) on 16 April 2014

Protocols for the data transfer and visualization of both HF radar and surface wind field (Aladin/HR and WRF-ARW) through the ORACLE database and GIS-oriented programming have been developed (Milestones 9).

Two project proposal related to the NEURAL project have been submitted in the reporting period, the first at national level as a research project to the Croatian Science Foundation call (project ODA), and the second at international level as a research project to the Horizon 2020 BG-9 Call (project EMILIA). Also, SINAI project proposal has been currently build for the ERC CoG 2014 Call (deadline in May 2014), dealing with signal processing implementation in geosciences and environmental sciences, leaded by Ivica Vilibić.



Finally, a dissemination of the project has been carried out through the reporting period. Two targeted lectures about the project have been held, the first for high-level specialists in the audience at the leading Croatian research institution, Ruđer Bošković Institute, and the second for public in the frame of Festival of Science.