



Roadmap for an action

Priority Area 5 - To manage environmental risks

Action 3 - “To extend the coverage of the European Floods Awareness System (EFAS) system to the whole Danube river basin, to step up preparedness efforts at regional level (including better knowledge of each other's national systems) and to further promote joint responses to natural disasters and to flood events in particular, including early warning system.”

Milestone n°. 1:

- **Work:** Establishment of the three operational EFAS centres for hydrological data collection, computation, and dissemination of EFAS information as part of the initial operational of GMES Emergency Management Service, which has entered its Initial Operation (GIO) phase following Regulation (EU) n°911/2010 of 22 September 2010 on “The European Parliament and the Council on the European Earth monitoring programme (GMES) and its initial operations (2011 to 2013)”.
- **Output:** The winners of the public tenders for i) **EFAS computation centre** (European Centre for Medium Range Weather Forecasts), ii) **EFAS dissemination centre** (Consortium of Swedish Meteorological Hydrological Institute, the Dutch Rijkswaterstaat and the Slovak Hydrometeorological Institute) and iii) **EFAS hydrological data collection centre** (Consortium of the Andalusia Environment and Water Agency, and the Spanish private company ELIMCO Sistemas) will be setting up and establishing the EFAS operational centres according to specific contracts issued by the JRC.
 - Responsible: JRC;
 - Deadline: End of August 2012

Done. Following a kick off meeting with all three centres in January 2012, the three centres were awarded contracts to start establishing the operational centres. This task was concluded for the computational centre in September, for the dissemination centre in October and the hydrological data collection centre in November. Meteorological data collection applications are continued to be onsite the JRC but by external contracts.

Milestone n°. 2:

- *Work:* Operational running of EFAS at the operational centres mentioned in Milestone 1
- *Output:* EFAS running operationally at each centre as a 7/365 service producing probabilistic early flood forecasting information twice daily which will be distributed daily to the EFAS Danube partners via a username and password protected website and daily summary updates on the flood situation in Europe to the Monitoring and Information Centre (MIC), the operational heart of the Community Mechanism for Civil Protection in Europe to assist aid management during trans-national flood crisis in the Danube river basin.
 - Responsible: JRC;
 - Deadline: ending of GIO ERS in 2013 (initially, further continuation under discussion)

Done. A full operational EFAS is running in all three centres since autumn 2012. The service is monitored by the JRC and a shadow system is maintained by the JRC for a minimum period of 6 months. Further development and adaptation of the system to end-user needs are being prepared by JRC. The first EFAS annual meetings since fully operation was held in April 2013 in Bratislava with a high participation of Danube partners.

The new developments of EFAS include an improved meteorological dataset for model calibration and model climatology, new hydrologic model calibration (more calibration points on the Danube), updating the EFAS thresholds and improved initial conditions (water balance) for the flood forecasts (based on the new calibration and higher density near real time meteorological stations).

Furthermore, the improved EFAS web interface includes now the visualization of initial conditions and anomalies. Using ECMWF VAREPS the forecasts will be extended to 15 days.

EFAS operation funding has been secured until 2020 through Copernicus program (funding goes directly to partner consortia). JRC budget is foreseen for further EFAS developments.

JRC invited Ukraine and Bosnia and Herzegovina to become EFAS partners.

Milestone n°. 3:

- *Work:* Following the changes in the operation of EFAS (See Milestone No 1) contact all partners to modify the partnership agreement and contact the remaining hydro/meteorological services responsible for flood forecasting to become a new partner (incl. Ukraine and Bosnia and Herzegovina as the last big regions of the Danube to become EFAS partner)
- *Output:* Modified conditions of access for all EFAS partners and increase of EFAS partners
 - Responsible: JRC;
 - Deadline: 31/12/13

The following Danube river basin countries have signed the new EFAS conditions of access which was necessary due to the transfer of EFAS into the fully operational phase (See Milestone n°.1): Bulgaria, Croatia, Czech Republic, Germany (Bavaria), Hungary, Romania, Serbia, Slovak Republic and Slovenia. Austria, Moldova, Germany (Federal Institute of Hydrology) and Ukraine are currently in the process of signing the agreement. Contacts to the corresponding

authorities in Bosnia and Herzegovina as well as Montenegro have been established .

Milestone n°. 4:

- *Work:* Annual training on EFAS, its methodologies, concepts, products and results for EFAS Danube partners
- *Output:* 1-2 day information day on EFAS for all partner organisations
 - Responsible: JRC;
 - Deadline: August 2012 & August 2013

Done. Information and training on EFAS was given at the 7th annual EFAS meeting in Norrköping, Sweden (12-13 June 2012), as well as at the 8th annual EFAS meeting in Bratislava, Slovakia (24-25 April 2013) including also the Danube partners. Furthermore, in the preparation of the operational EFAS centres a dedicated training was given to the Slovak Hydrometeorological Institute, which forms part of the EFAS Dissemination consortium, in 2012 at the JRC.

Milestone n°. 5:

- *Work:* Bi-monthly bulletins distributed to all EFAS partners providing a summary of on-going work, hydro-meteorological situation and description of case studies with special focus on Danube case studies if appropriate
- *Output:* Bi-monthly bulletins
 - Responsible: JRC;
 - Deadline: regular bi-monthly

Done. The bi-monthly EFAS bulletins are freely available on <http://www.efas.eu/efas-bulletins.html>.

Milestone n°. 6:

- *Work:* Specific ICPDR training workshop on EFAS, its methodologies, concepts, products and results
- *Output:* 1/2 day information day on EFAS for ICPDR partners
 - Responsible: JRC;
 - Deadline: December 2014

A ½ - 1 day training specific to EFAS is envisaged during one of the next ICPDR meetings. The training would cover background information on EFAS and illustrate the interface that has been developed.

Milestone n° 7:

- *Work:* Find financing possibilities for EFAS beyond 2013
- *Output:* Budget for the operation of EFAS beyond 2013
 - Responsible: JRC; PA5 coordinators
 - Deadline: June 2013

Done. The European Commission has foreseen budget to continue the initial operations of GMES/COPERNICUS including an operational EFAS. Once the multi-annual financial framework of the European Commission which includes the GMES/COPERNICUS budget has been approved the funding of EFAS will be established.

Milestone n° 8:

- *Work:* Early warnings for flash flood like events by using high resolution weather forecasts for the Danube river basin.
 - Further scientific definition, and development of the currently existing method in EFAS (mid 2014);
 - Expansion of the updated monitoring and warning system for the whole Danube Region (end 2014)
- *Output:* Flash flood early warning system. Monitoring network and data dissemination system.
 - Responsible: SG, the Flood Protection Expert group of the ICPDR, JRC
 - Deadline: 2014,

A flash flood early warning component has been developed by the JRC and on request of the EFAS partners is now fully integrated into EFAS. It is an extreme forecasting index for severe precipitation events that have a potential to lead to flash floods. Further information can be found here: A European precipitation index for extreme rain-storm and flash flood early warning, L. Alfieri, J. Thielen, DOI: 10.1002/met.1328

Flash flood warnings are sent out based on this indicator to all EFAS partners including the Danube region.

Currently work is ongoing to improve this flash flood warning by including outputs from EFAS such as state of the soil moisture and by incorporating information on the landslide susceptibility in the affected areas.

GAPS:

1. No gaps. Follow the evolution of EFAS both from financial and scientific (flash flood forecasting) point of view.