



BLACK SEA AND MIDDLE EAST FLASH FLOOD GUIDANCE SYSTEM





Needs



- Floods occur mostly as flash floods in Turkey, causing dozens of deaths annually,
- There are not any *enough (sufficient)* efforts to prevent human and property losses due to flash floods,
- *Only limited* flash flood warnings are issued,
- There are *not enough* institutional capacities and cooperation among responsible authorities,



Needs (Cont.)



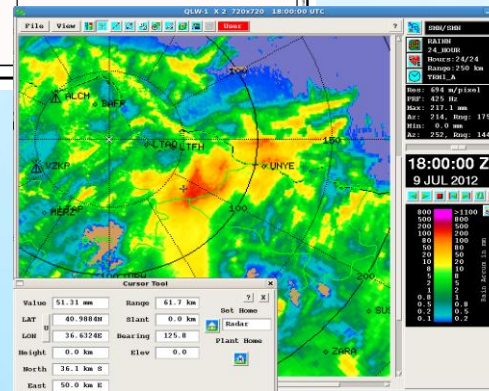
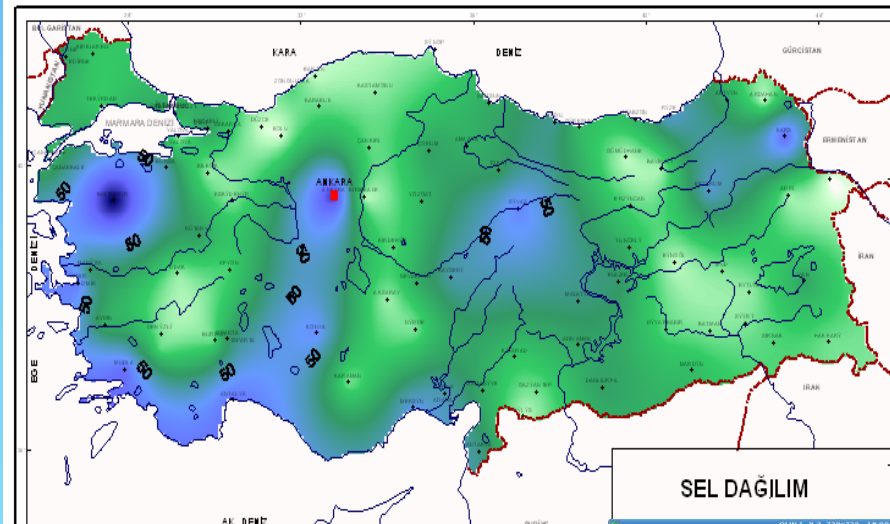
- Rivers forecasting systems are not sufficient for flash flood warnings,
- Meteorological observation networks are located in cities and towns while stream gauges are used for river flooding, reservoir design and operations,
- Flash flood occurrence increased due to increase of thunder storm frequency.



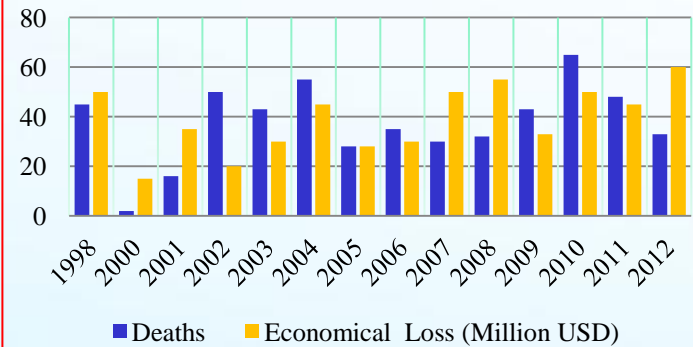
Needs (Cont.)



Flood Frequencies:



Human and Economical Losses due to Floods in Turkey



Flash flood occurred in Samsun province on 3 July 2012 and Radar precipitation.



Project Objectives

- **General objective** is to establish Flash Flood Guidance System in the Black Sea and Middle East Region as a part of worldwide WMO network in order to increase regional capacity to mitigate the adverse affects of flash floods.
- **Specific objective** is to produce operational flash flood guidance products for national Hydro-Meteorological Services, Disaster and Water Management Authorities to provide real time flash floods warnings with high hit rate.



Black Sea and Middle East Flash Flood Guidance System (BSME-FFG)

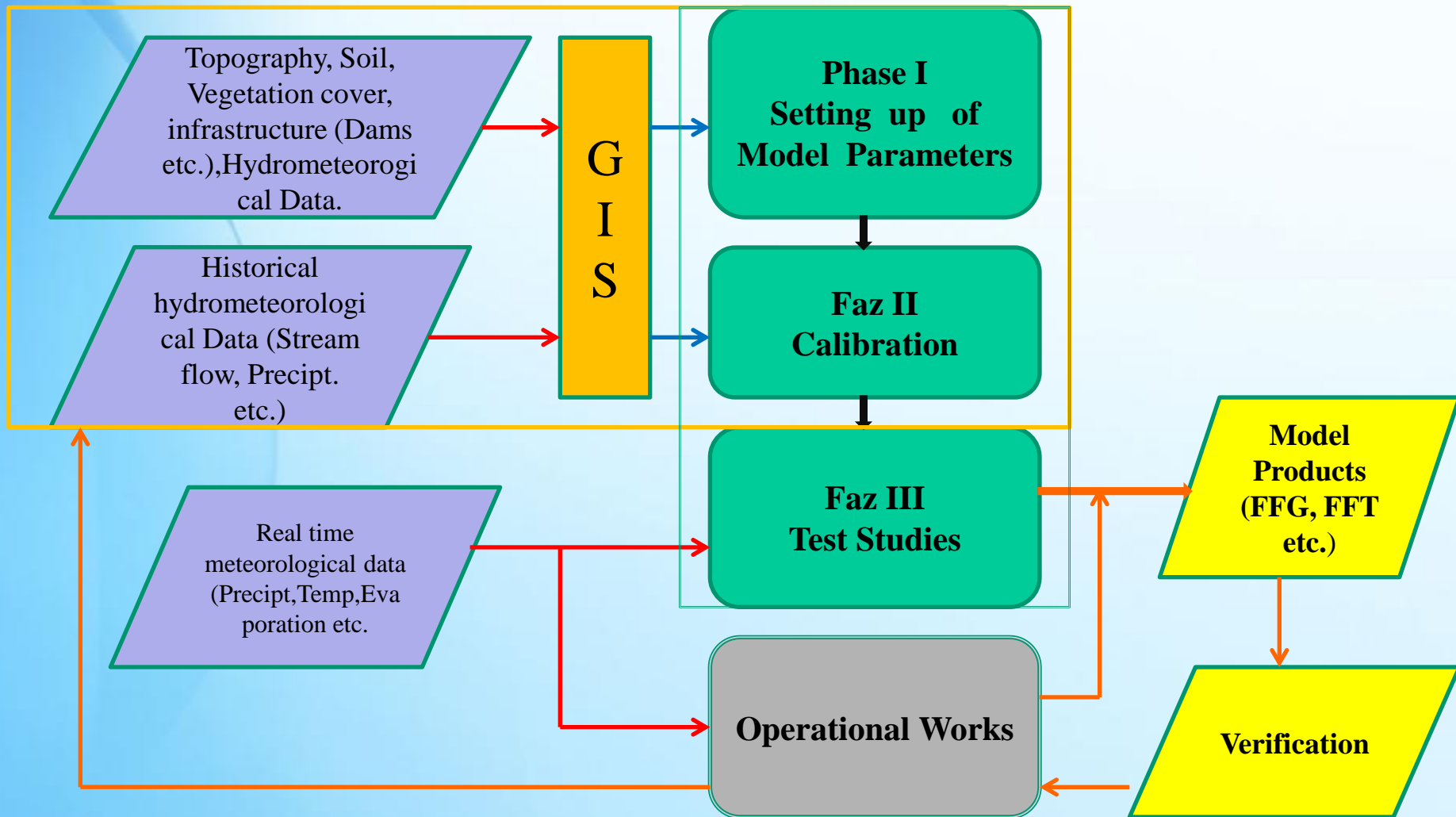


- BSME-FFG initial meeting was held in Istanbul on 29-31 March 2010 with the participating countries of Turkey, Azerbaijan, Georgia, Armenia, Iraq, Syria and Lebanon and Turkey was elected as regional center.
- **Turkey, Azerbaijan, Georgia, Armenia, Syria and Bulgaria** have sent Letters of Commitment to WMO .





Implementation Phases

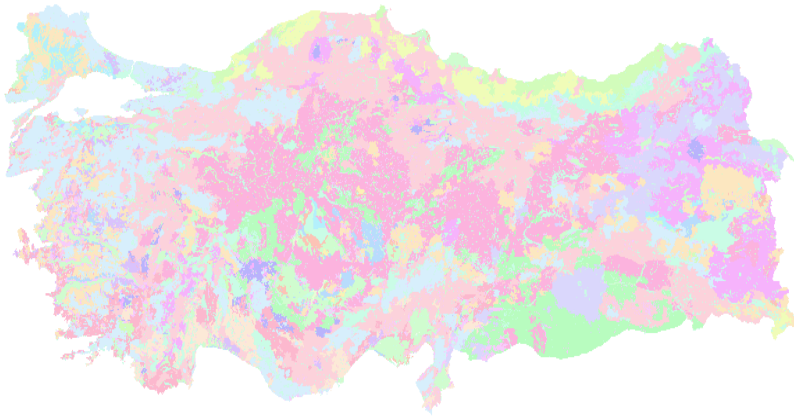




Data

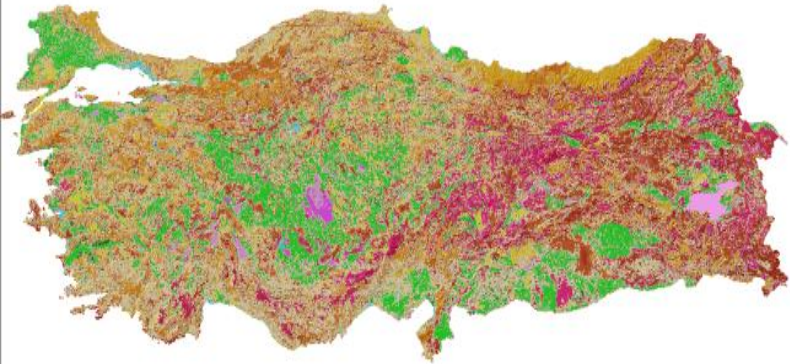


Soil



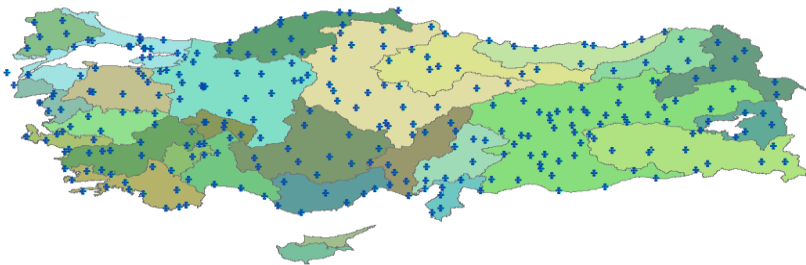
Source: Ministry of Food, Agriculture and Livestock

Vegetation



Source: Ministry of Forestry and Water Works

30 years of historical meteorological data



- Precipt,
- Temperature,
- Radiation,
- Sunshine,
- Evaporation,
- Soil moisture,
- Winds etc.

In additions, Topography, Rivers, Dams, Lakes, Stream flow data were provided.



Calibration



19 Meteorological and Stream flow stations where floods occurred



▲ Stream flow std.

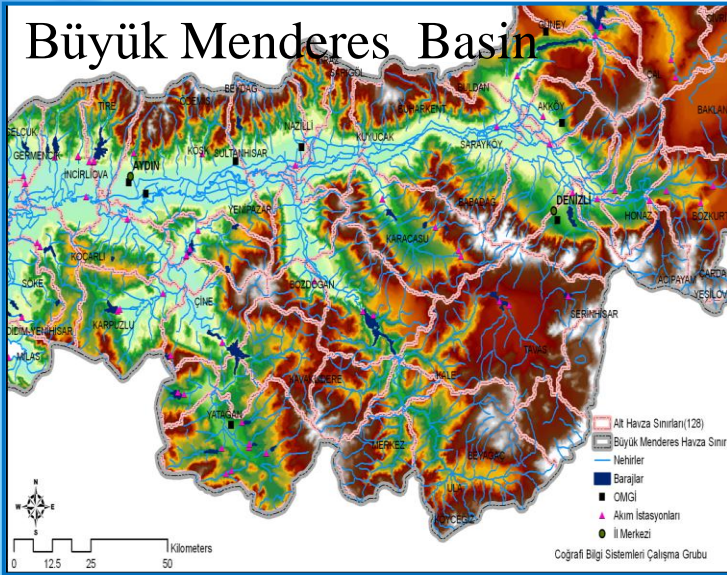
■ Met. Std.



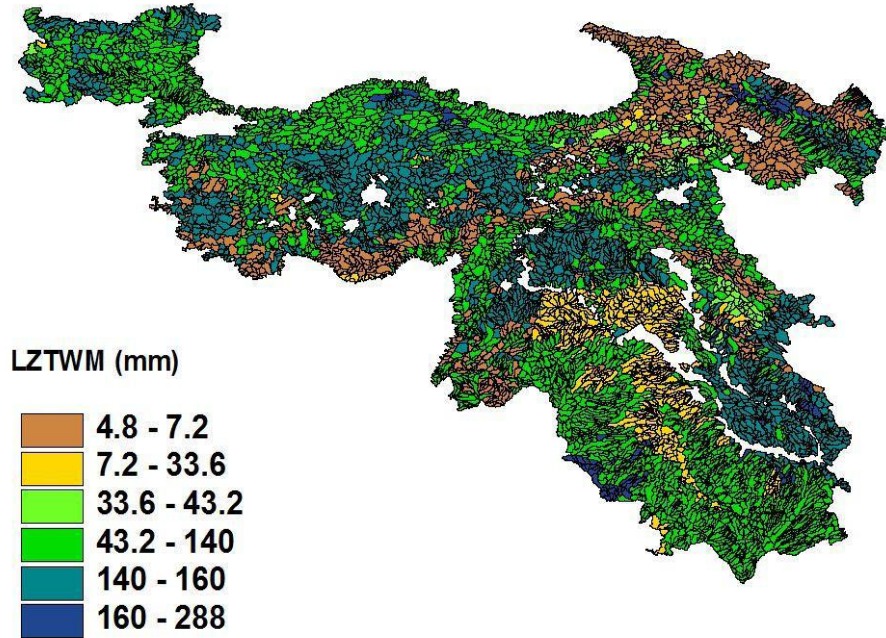
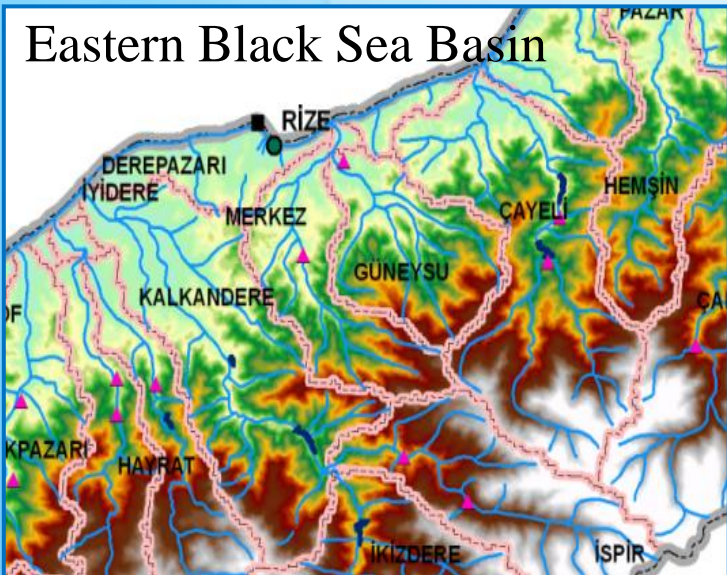
Sub-basins



Büyük Menderes Basın



Eastern Black Sea Basin

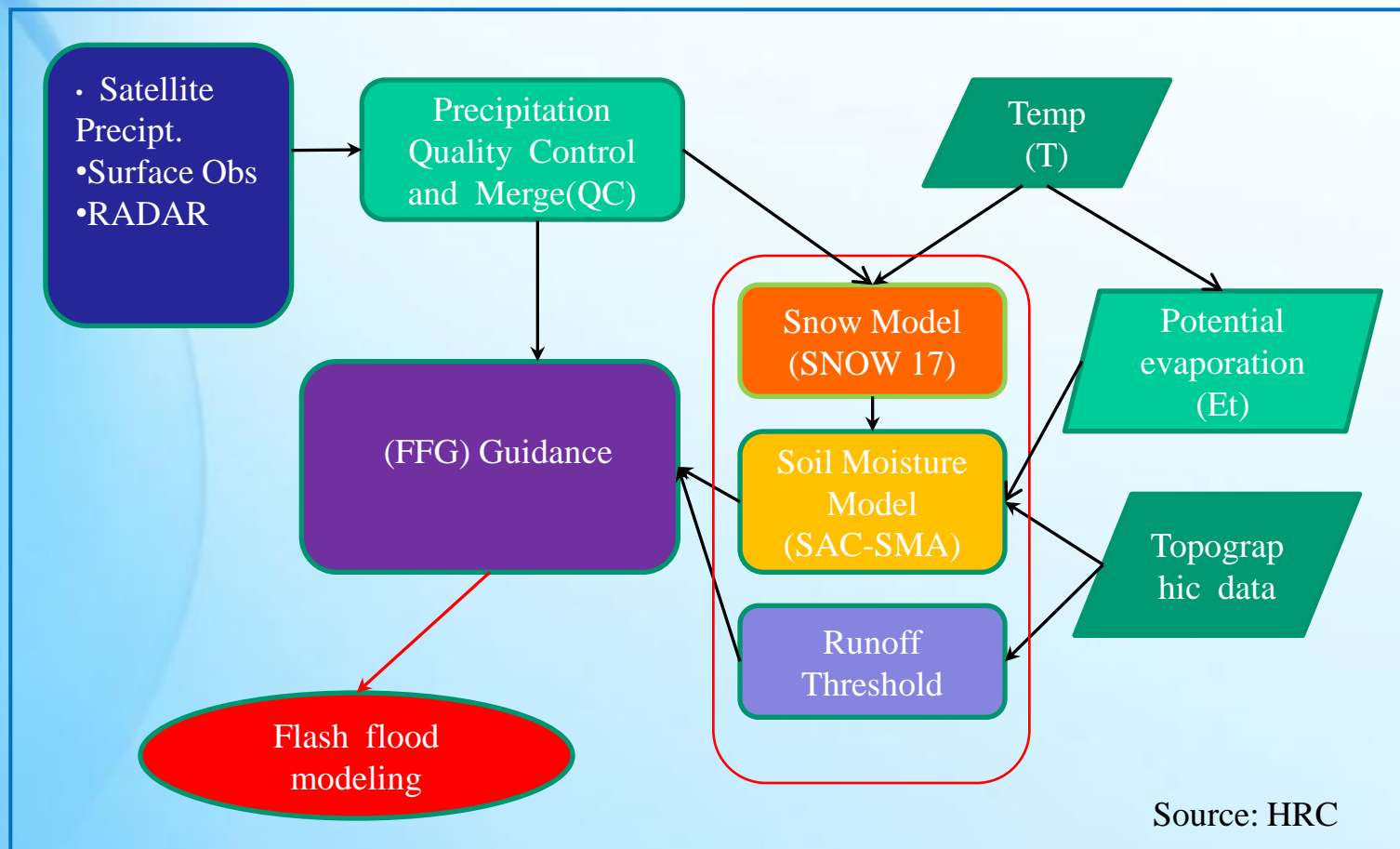


Source: HRC

6.900 and 2.900 sub-basins were created for the participating countries and Turkey, respectively.

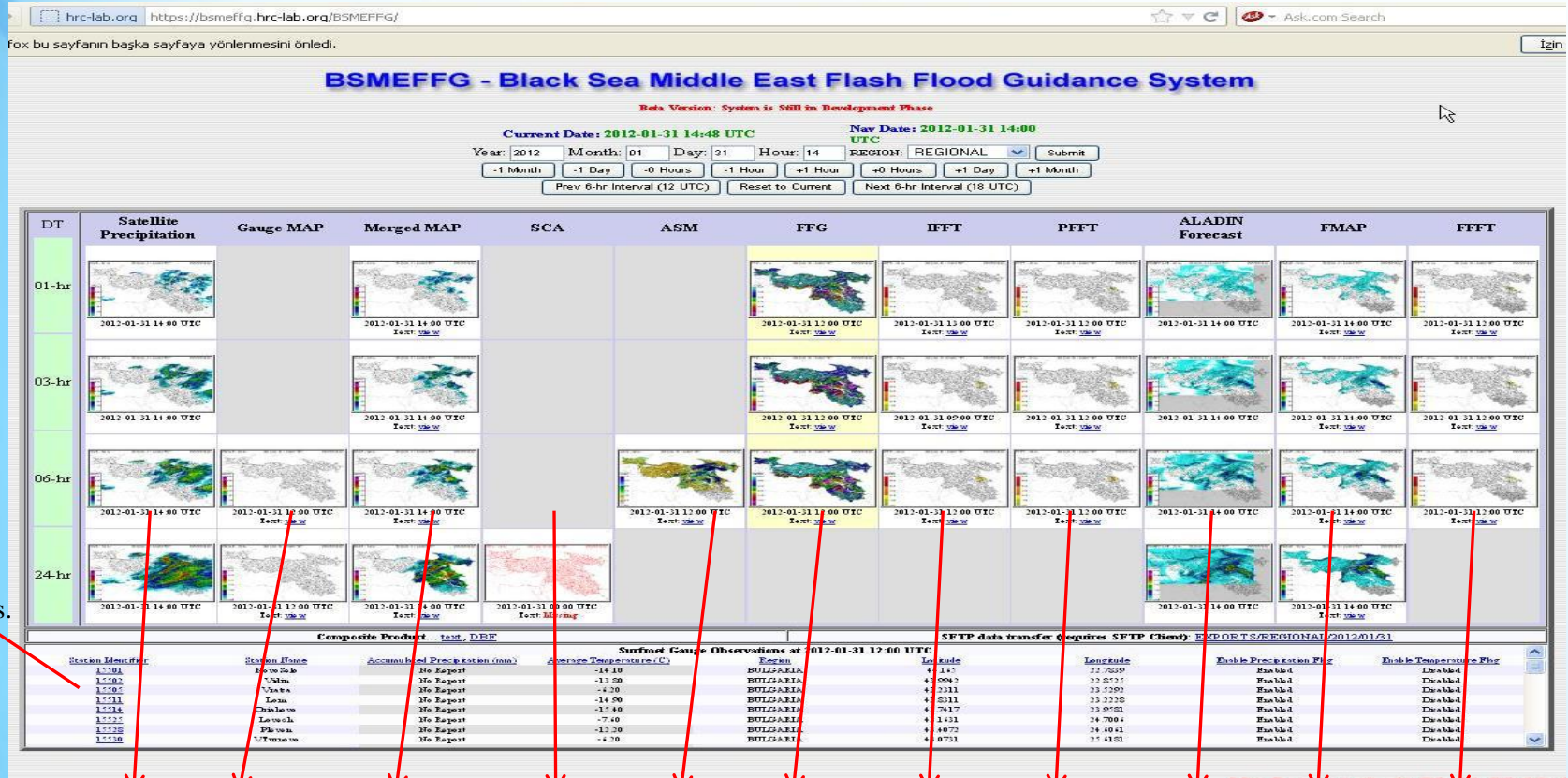


Flash Flood Guidance Model Concept





Products

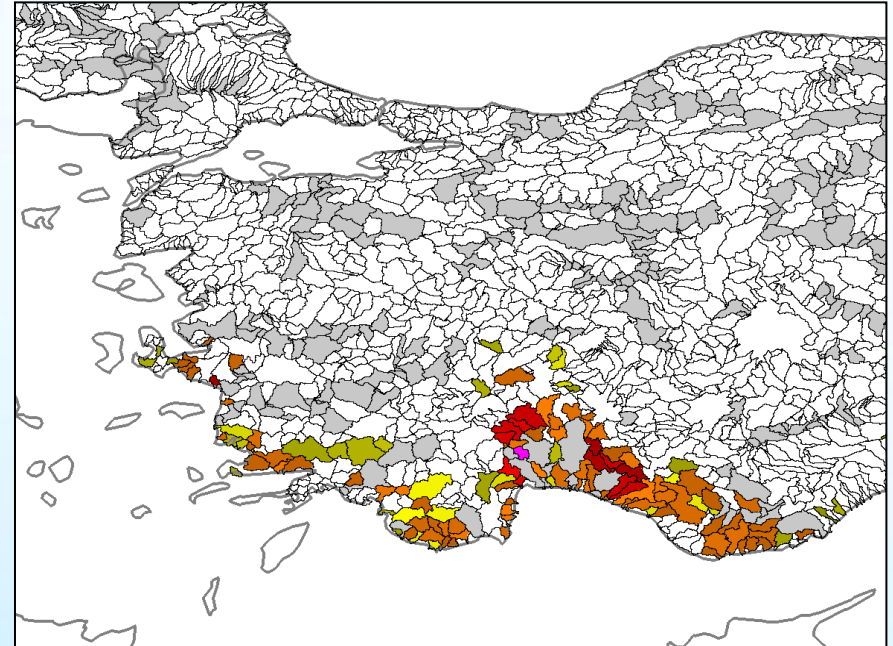
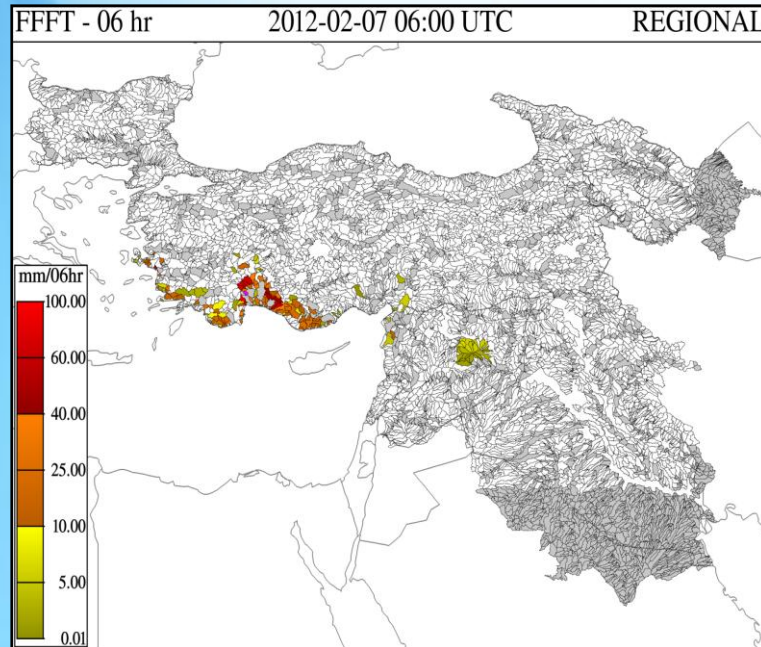


Sat.Precip Precip. Obs. Merged Precip Frac.Snow Cov. Soil moisture FFG IFFT PFFT ALADIN Model FMAP FFFT

FFG: Bankfull precipitation amount
FFT: Axces bankfull precipitation



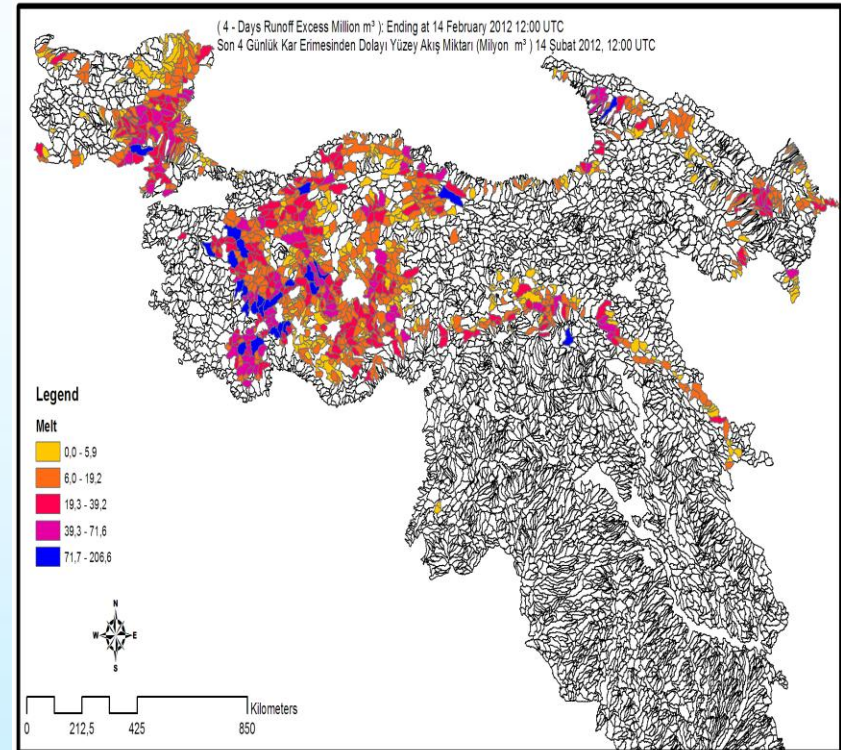
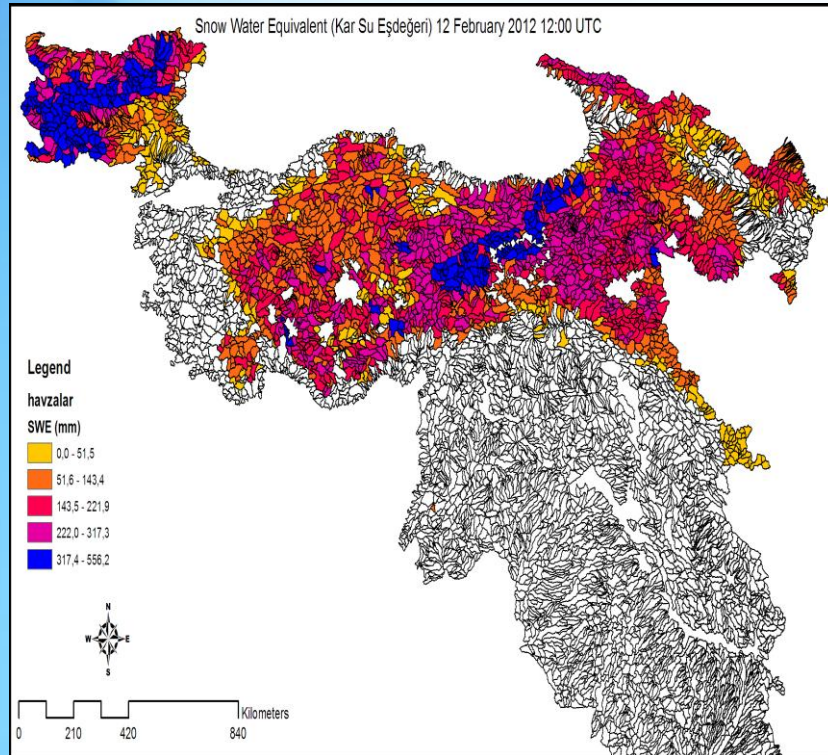
Model Products: FFFT



- Flash flood warnings issued 6 hours before the flash floods occurred on 7 January 2012 in the Southern Aegean Sea Region and Mediterranean Region

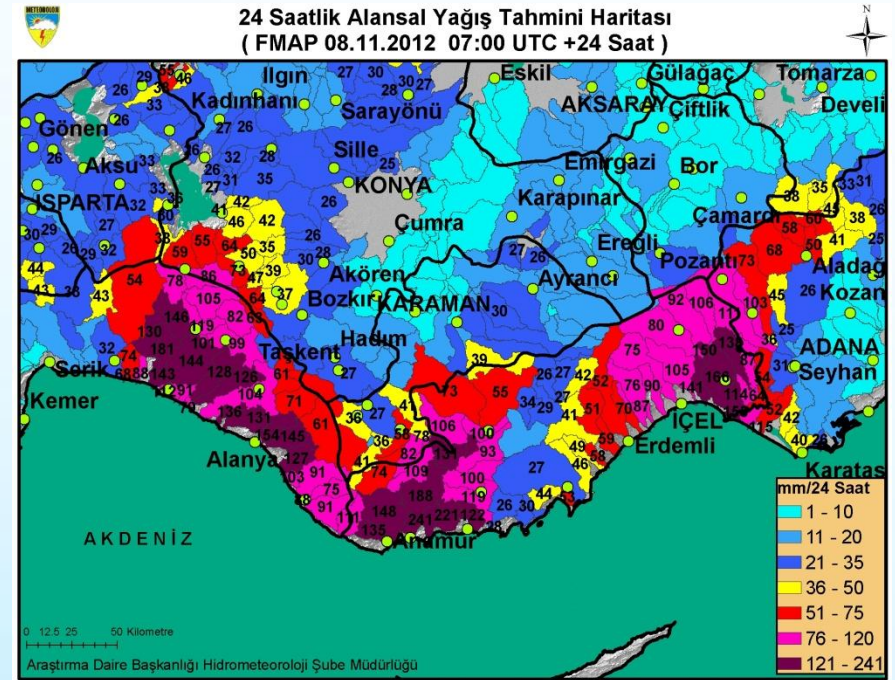
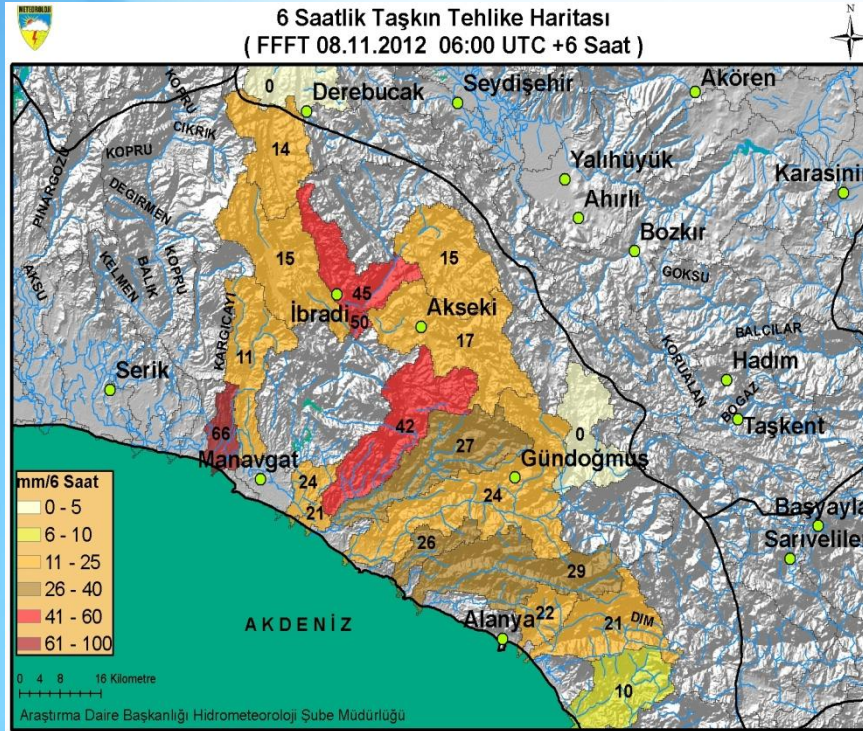


SWE / MELT





BSME-FFG Bulletins/ArcGIS WEB Application



- FFG Bulletins are prepared by adding more GIS layers and dispatched by e-mail to Minister, Undersecretary of Ministry, Director Generals of State Hydraulic Works (DSI) and other relevant institutions.
- We are working with ESRI representative to produce ArcGIS WEB applications to put more GIS layers automatically and easy access to forecasters and users.



Verification of Bulletins



	Observation			
		Y	N	
Bulletin (21 May-12 Dec. 2012)	Y	31	18	49
	N	8 (DSI)		8
		39	18	57

Source: FEVK observations, DSI records, and press

Hit Rate: 0.79

Threat Score:0.54

False Alarm Ratio:0.37

For all events that had fatalities, warnings were issued.



Meetings/Workshops



International training course on flash flood forecasting concept , Ankara,12-16 September 2011.



Regional workshop on snow accumulation and melt in Southeast Europe (SEE) and Black Sea and Middle East (BSME),Ankara, 26-29 March 2012.

Because FFG is a Worldwide project, we propose to hold annual/biannual FFG user conference to bring together scientists and users.

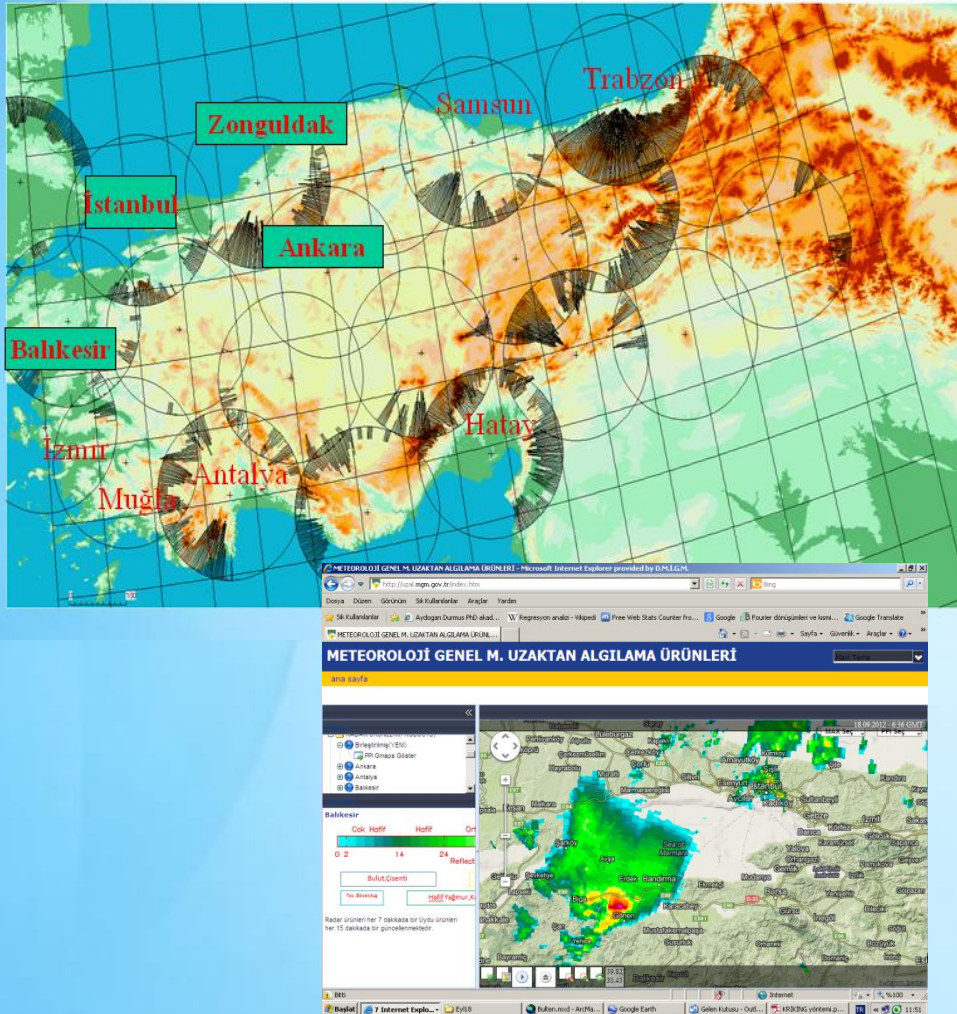
93rd AMS Annual Meeting, Austin Texas 6-10 January 2013



RADAR Data



Current Weather Radar Network:



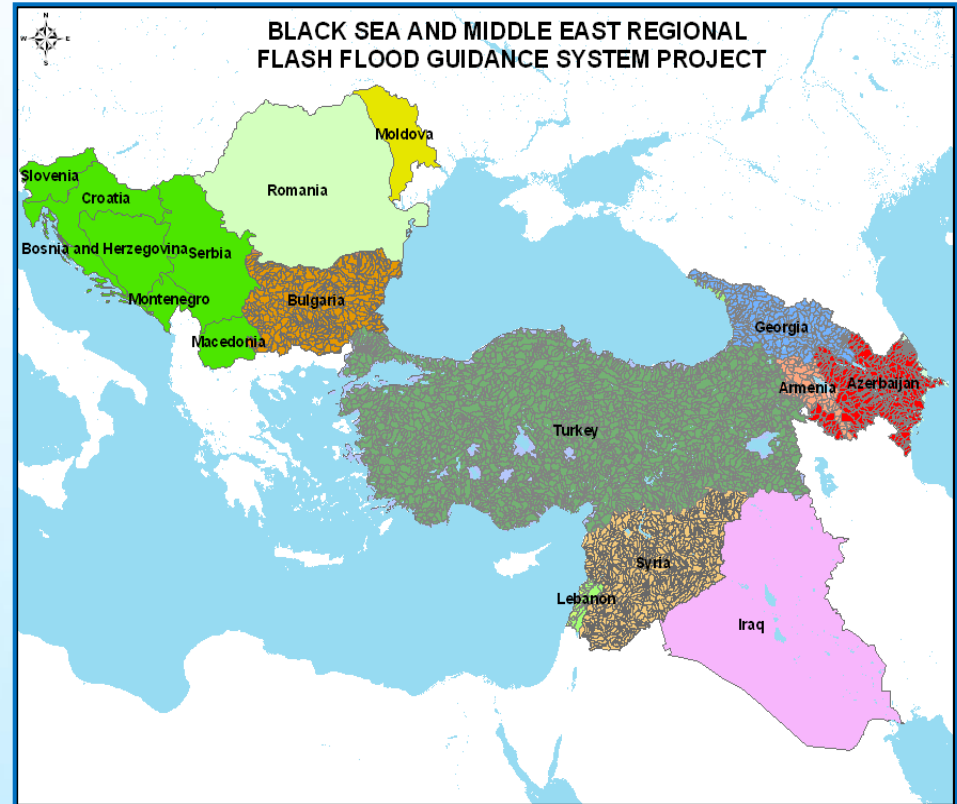
- Doppler Capability;
- Dual Polarimetric (Ankara Radar);
- Single Polarizasyon (Istanbul, Zonguldak, Balıkesir);
- Klystrone;
- Beam Width (0.7 deg, 1deg Ankara radar);
- Frequency 5625 ± 25 MHz;
- Pulse Width (μ s) 0.5–3 μ s;
- Peak Power (Kw) 250 kW;
- Antenna Diameter 7 meters, 4.2 meters (Ankara radar);
- Signal Processor: SIGMET;
- Product Software: IRIS, RAINBOW.



Future Activities: Southeast European FFG



There will be a planning meeting in Turkey on 22-24 January 2013 for implementation of an FFG system for Southeast European region modeled after the BSMEFFG system implementation.





Thanks a lot for your attention...

We would like to thank to all HRC staff and
Dr. Sezin Tokar of OFDA