WEATHER CLIMATE WATER
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# Overview of the Global Flash Flood Guidance System

WMO OMM

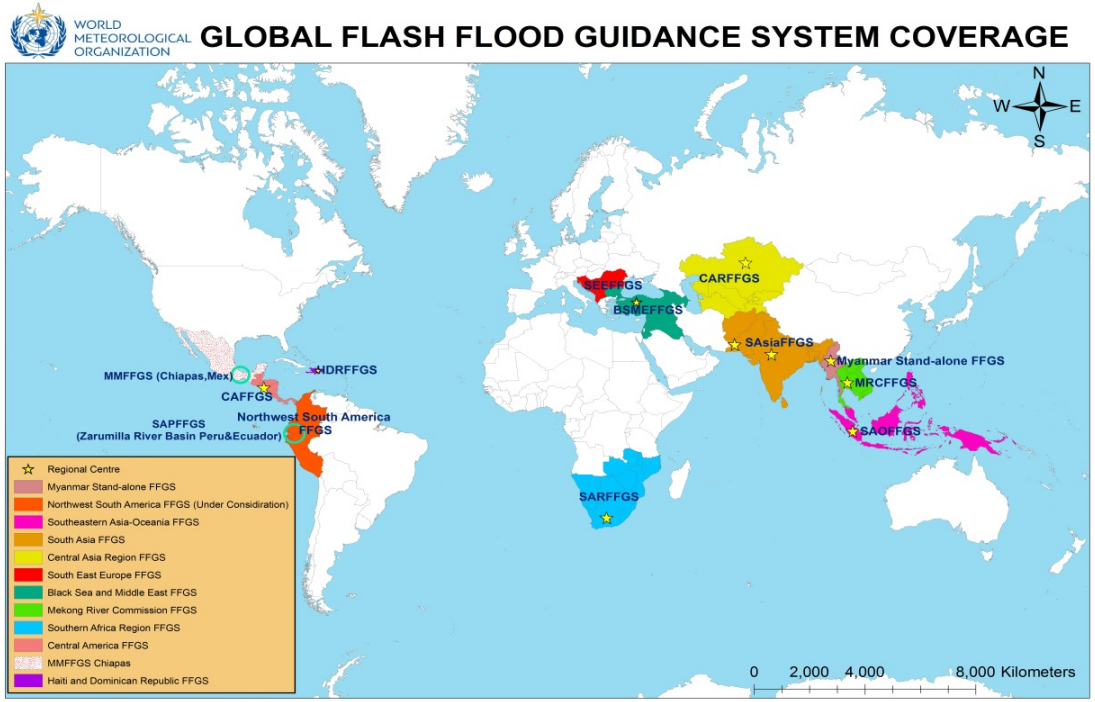
World Meteorological Organization
Organisation météorologique mondiale

# Flash Floods – The most deadly natural (weather-related) disaster in the world

- "Recent findings of the WMO country-level survey where of the 139 countries, 105 indicated that flash floods were among the top two most important hazards around the world and require special attention".

- "On the average, these events kill more people worldwide than any other [weather-related] natural disaster; in an average year, flash floods kill over 5,000 unsuspecting people and cause millions of dollars of property damage"(WMO 2008).

# Flash Flood Guidance System (FFGS)




Flash Flood Guidance System with global coverage (Resolution 21, World Meteorological Congress-XV) enhances early warning capabilities of the NMHSs, currently **covers more than 60 (sixty) countries** and **more than two billion people** around the world saving lives and decreasing economic losses.

The WMO Commission for Hydrology (CHy) jointly with the WMO Commission for Basic Systems (CBS) and in collaboration with the US National Weather Service, Hydrologic Research Center (HRC), and USAID/OFDA have developed the concept of the Flash Flood Guidance System (FFGS) with global coverage.

The concept has been endorsed by the Fifteenth WMO Congress and is being implemented through a series of regional projects with funding from USAID.

# Regional FFGS Projects

**The following regional Flash Flood Guidance (FFG) projects have been implemented or under implementation:**

- **Central America FFGS** (Operational): Costa Rica (Regional Centre RC), Belize, El Salvador, Guatemala, Honduras, Nicaragua, and Panama;
- **Southern Africa Region FFGS**: (Operational): Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa (RC), Swaziland, Zambia, and Zimbabwe;
- **Mekong River Commission FFGS** (Operational): Cambodia (RC), Lao People's Democratic Republic, Thailand, and Viet Nam;
- **Black Sea and Middle East FFGS** (Operational)**:** Armenia, Azerbaijan, Bulgaria, Georgia, Israel, Jordan, Lebanon, and Turkey (RC);
- **South East Europe FFGS** (Operational): Albania, Bosnia-Herzegovina, Croatia, Moldova, Montenegro, Romania, Serbia, Slovenia, The Former Yugoslav Republic of Macedonia, and Turkey (RC);

# Regional FFGS Projects

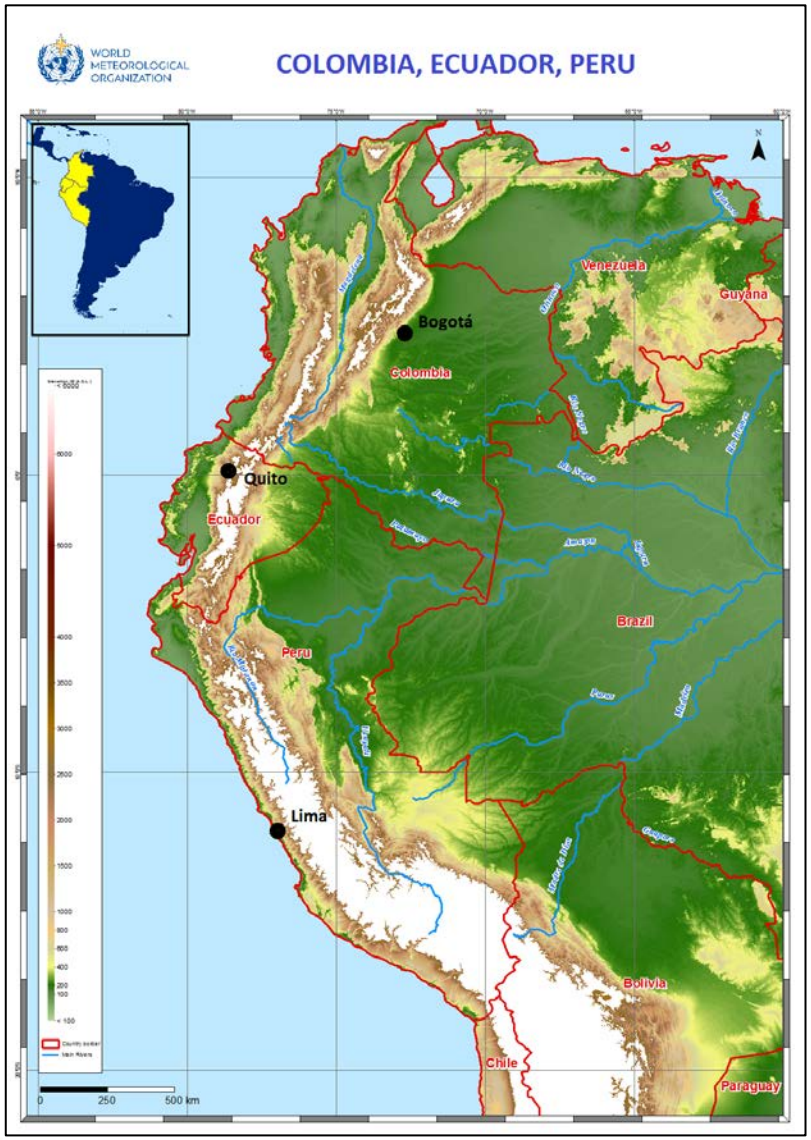
- **Southeastern Asia-Oceania FFGS** (under implementation): Brunei Darussalam, Indonesia (RC), Malaysia, Papua New Guinea, Philippines, and Timor-Leste;
- **South Asia FFGS** (under implementation): Afghanistan, Bangladesh, Bhutan, India (RC), Nepal, Pakistan (RC), and Sri Lanka;
- **Central Asia Region FFGS** (under implementation): Kazakhstan (RC), Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan;
- **South America Pilot FFGS (Completed): Zarumilla River Basin (Peru and Ecuador);**
- **Haiti and Dominican Republic FFG** (**HDRFFG**) (under implementation): Dominican Republic and Haiti;
- **Myanmar FFG System** (under consideration/implementation**).**

# Objectives of the FFGS with Global Coverage

The main objectives of the Flash Flood Guidance System with global coverage are to:

- enhance NMHSs capacity to issue flash flood warnings and alerts;
- mitigate adverse impacts of hydrometeorological hazards;
- enhance collaborations between NMHSs and Emergency Management Agencies;
- generate flash flood early warning products by using state-of-the-art hydrometerological forecasting models;
- provide extensive training including on-line training to the hydrometeorological forecasters;
- foster regional developments and collaborations; and
- support WMO Flood Forecasting Initiative.

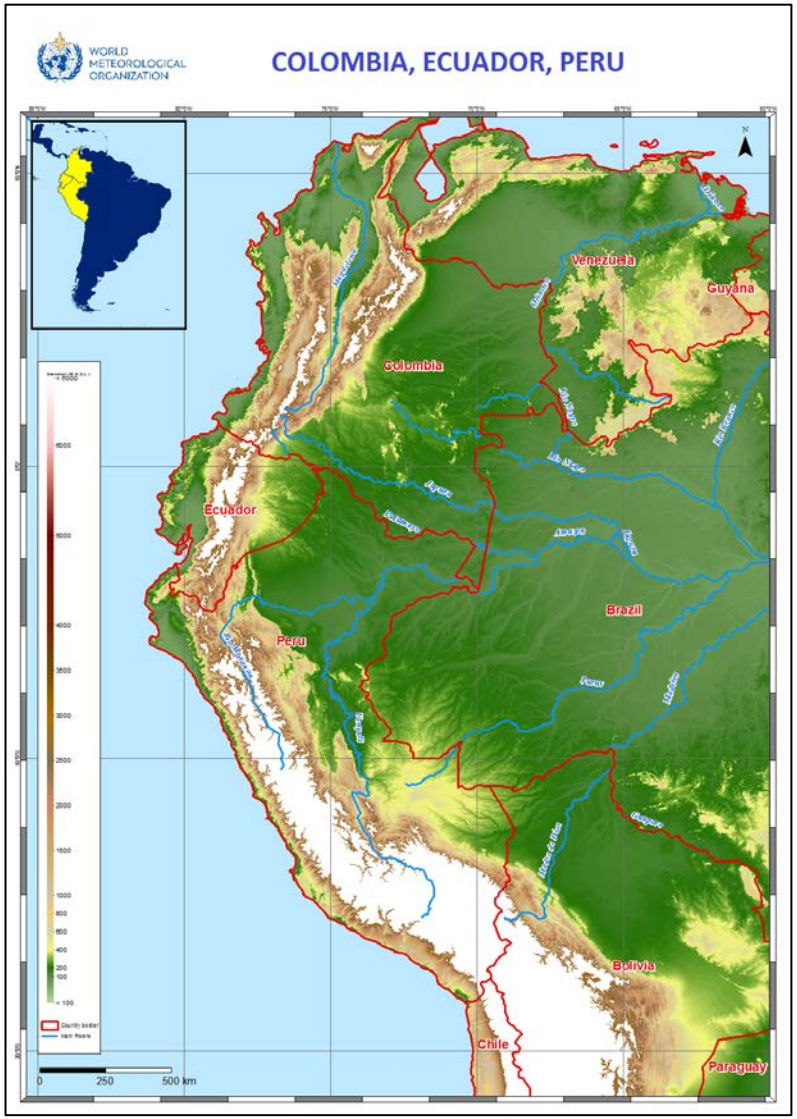
# The Regional Centre is to:



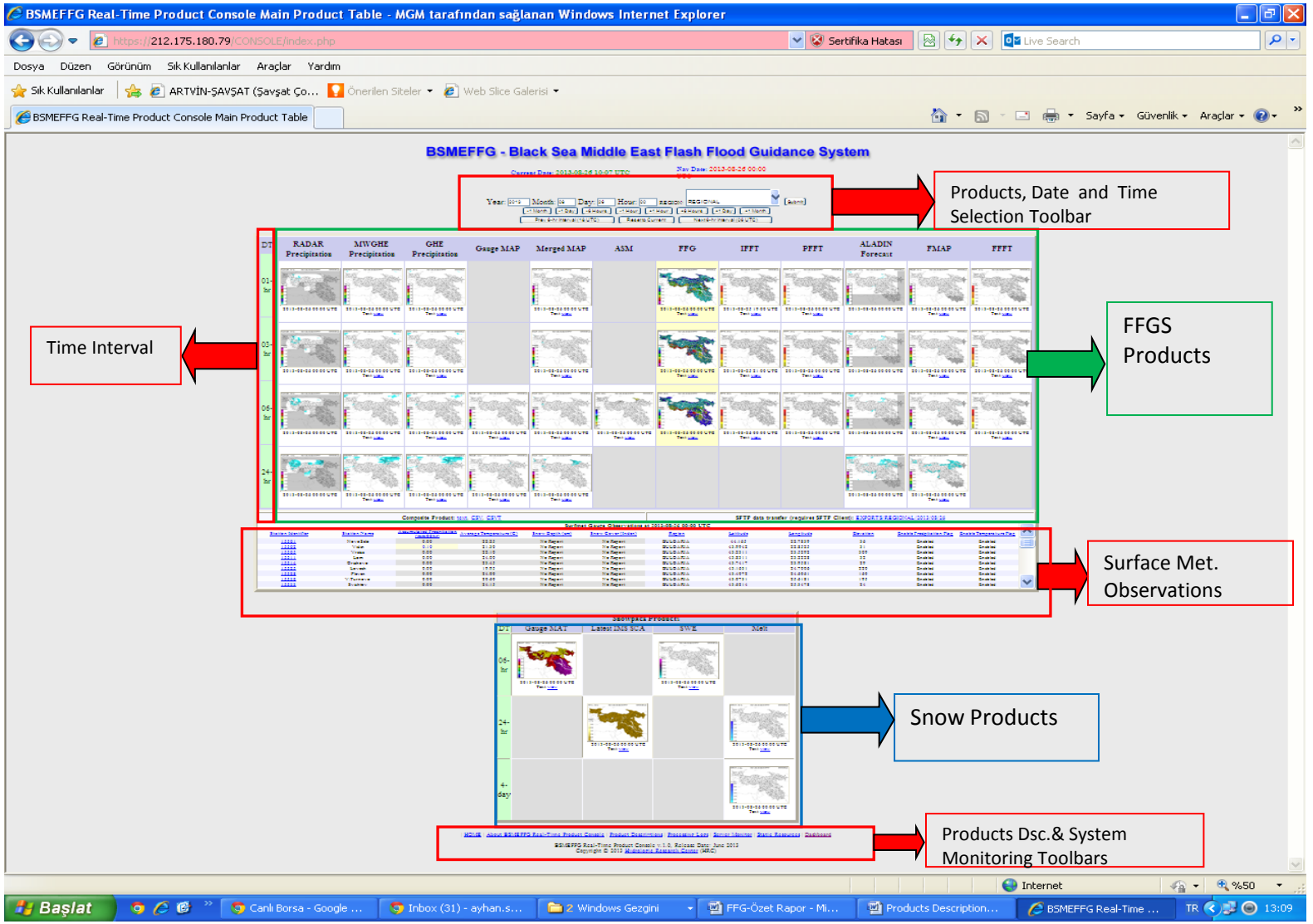

- Host the FFGS servers to provide products and data to the participating countries,
- collaborate with WMO and its project partners to implement the flash flood hydrometeorologist training programme,
- evaluate FFG products from the regional perspective and conduct verification studies in collaboration with the participating NMHSs, and
- have good IT infrastructure for data exchange and internet connectivity.

# The Participating NMHSs are to:

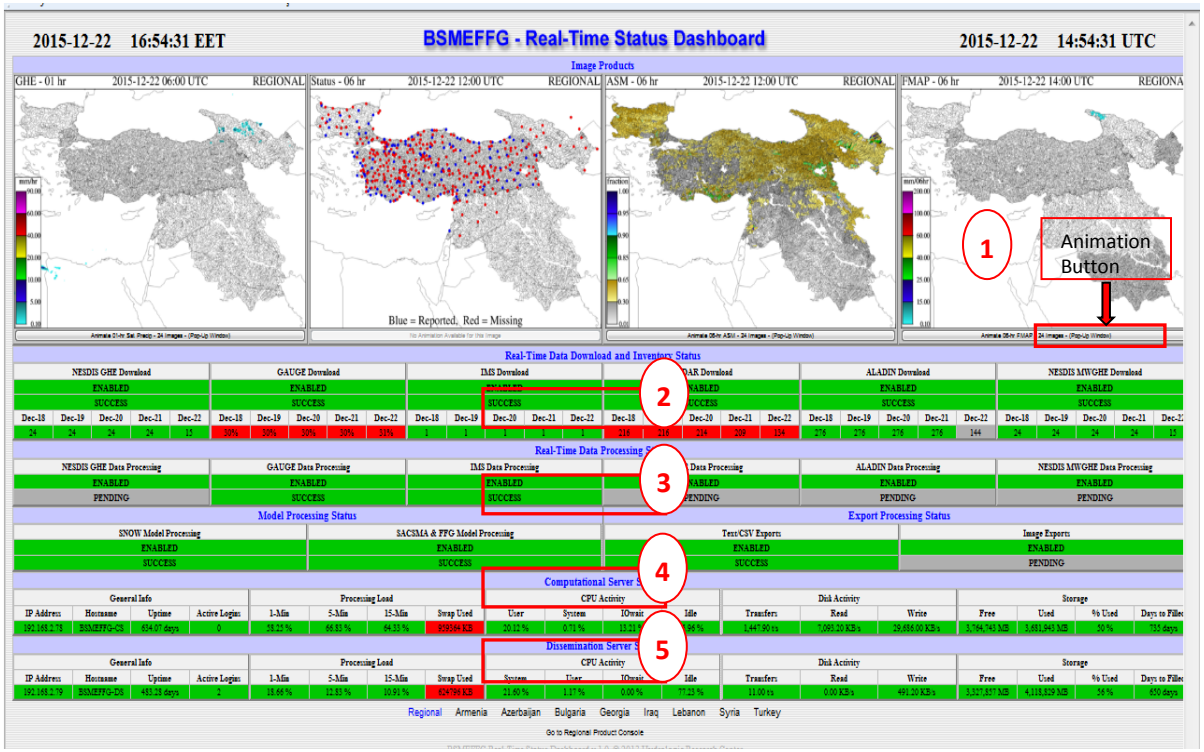
- Prepare and issue flash flood warnings and alerts to the public and national agencies including DMA,
- provide historical and in-situ local data to the FFG system developer through the RC,
- participate in the Flash Flood Hydrometeorologist Training Programme (Steps 1-5), and
- conduct verification studies.



# FFGS User Interface



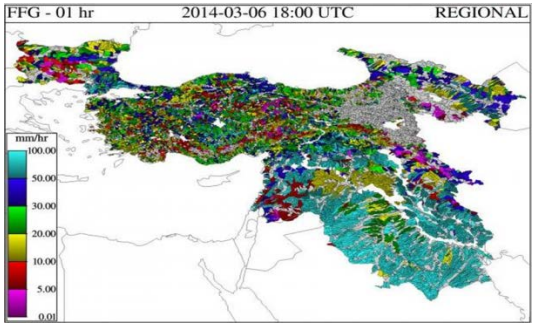
# FFGS Dashboard



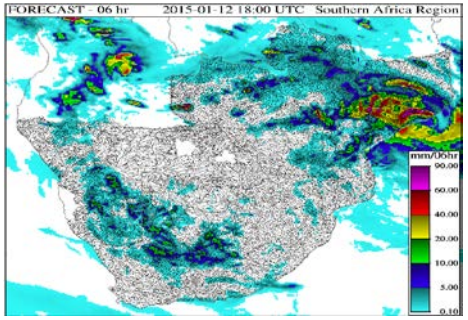

**Dashboard** is designed to monitor server processes:

- (**1**) Quick-look;
- (**2**) Real-Time data downloads and inventory status;
- (**3**) Real-Time Data processing status;
- (**4**) Computational server status; and
- (**5**) Dissemination server status.

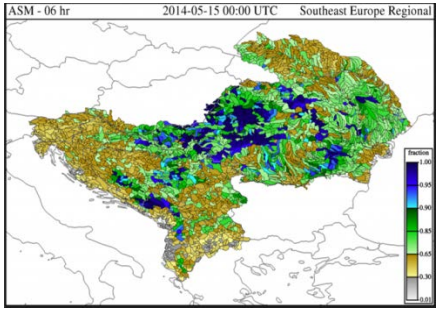
# FFGS Products



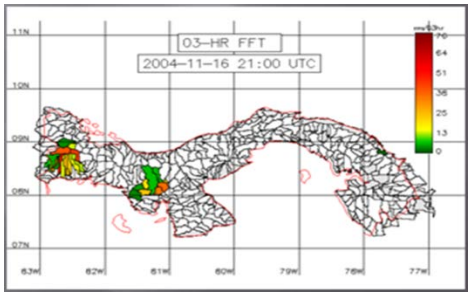

- Flash Flood Guidance for Black Sea and Middle East FFGS.



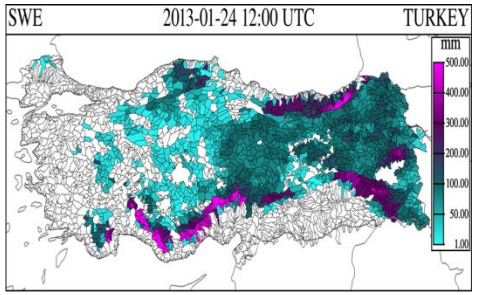

- GHE Satellite precipitation for Southern Africa Region FFGS.



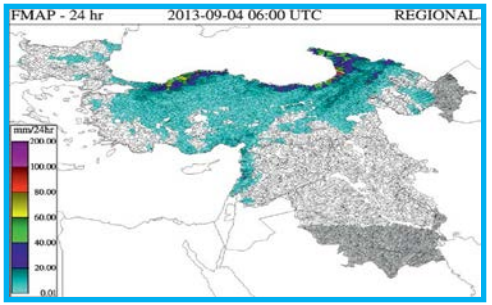

- Average Soil Moisture for South East Europe FFGS.




- Flash Flood Threat for Central America FFGS

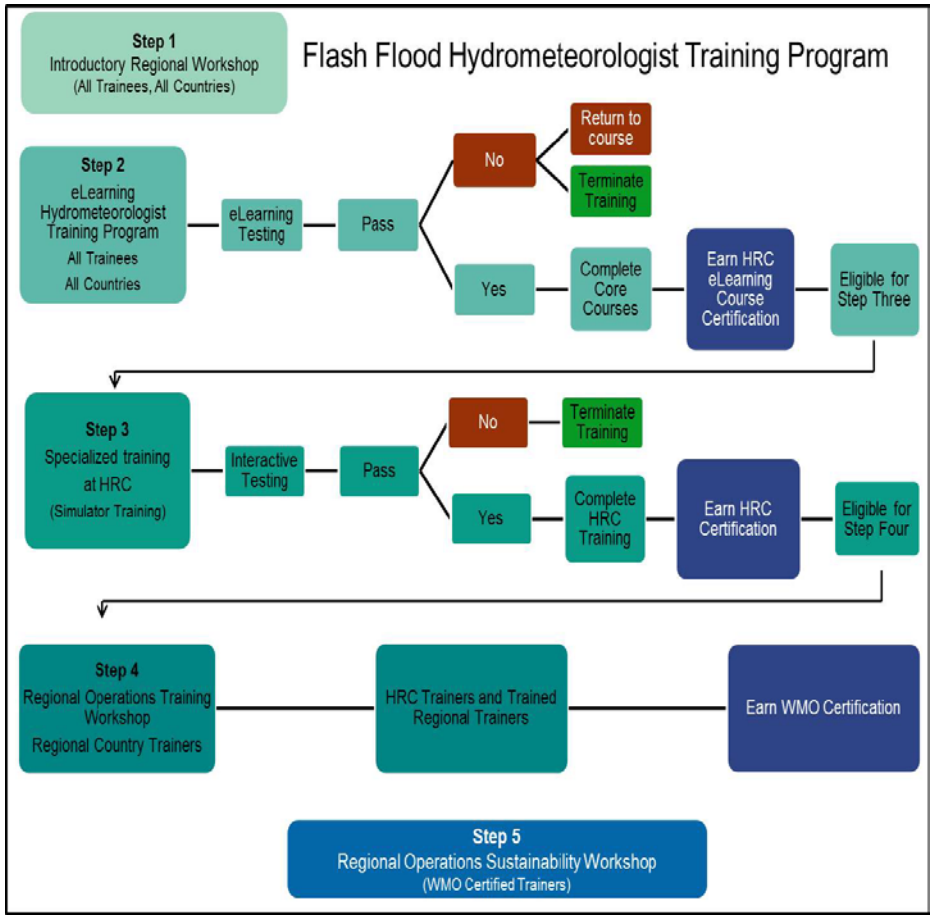



- Snow Water Equivalent (SWE) for Turkey.




- Forecast Mean Areal Precipitation for Black Sea and Middle East FFGS.

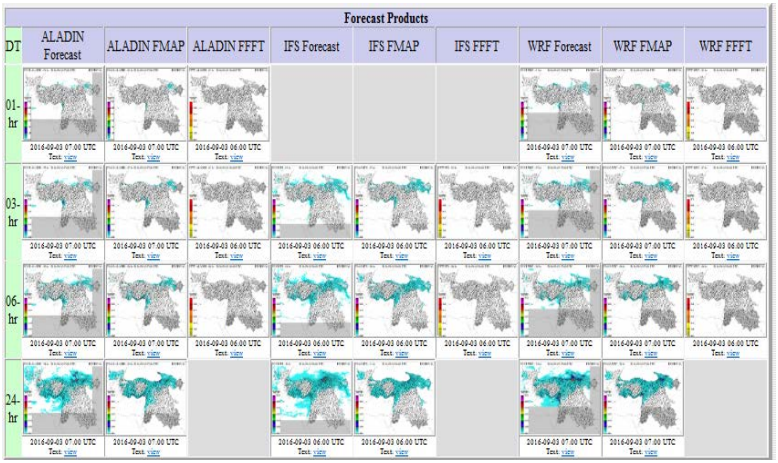
# Training Programme



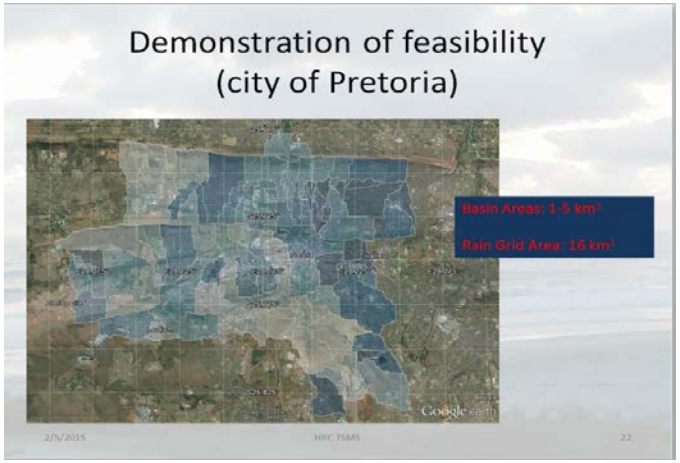

**Training is and integral part of regional FFG Systems and consists of five steps:**

**Step-1**: Introductory in-country workshops and meetings such as Steering Committee Meetings;
**Step-2**: On-line eLearning comprises elements of Meteorology, Hydrology, Flash Flood Guidance, GIS, and remote sensing;
**Step-3**: Advanced operations training at the Hydrologic Research Center (HRC), USA;
**Step-4**: Regional operations training workshop towards qualification of WMO flash flood trainer certificate;
**Step-5**: Regional operation sustainability workshop provided by the WMO certified trainer.

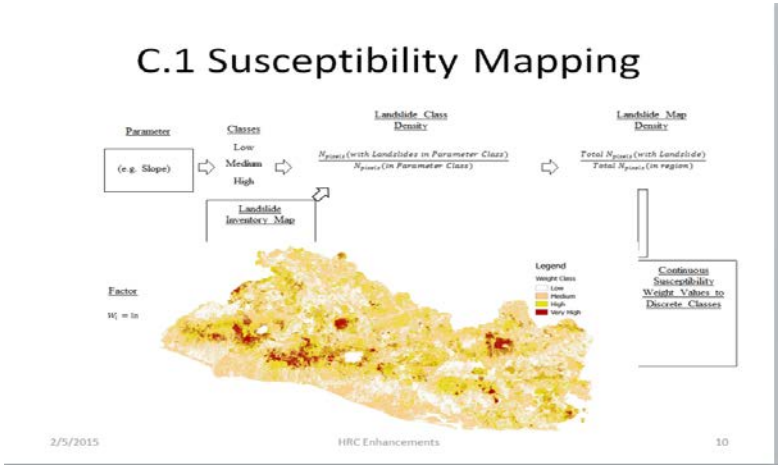
# FFGS Advances



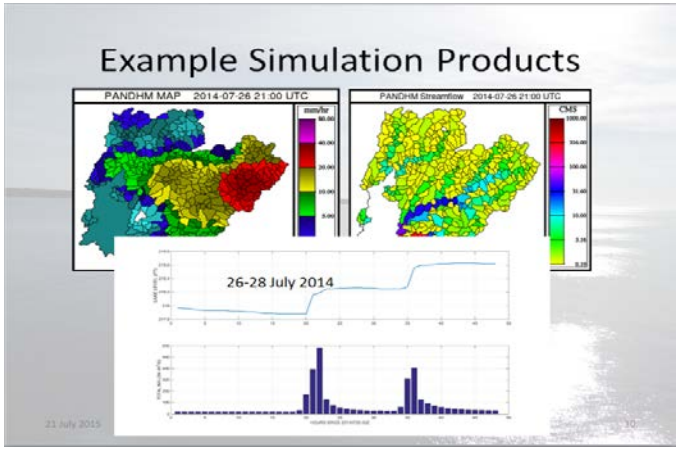

Multi-NWP Model ingestion




Urban Flash Flood Early Warning System

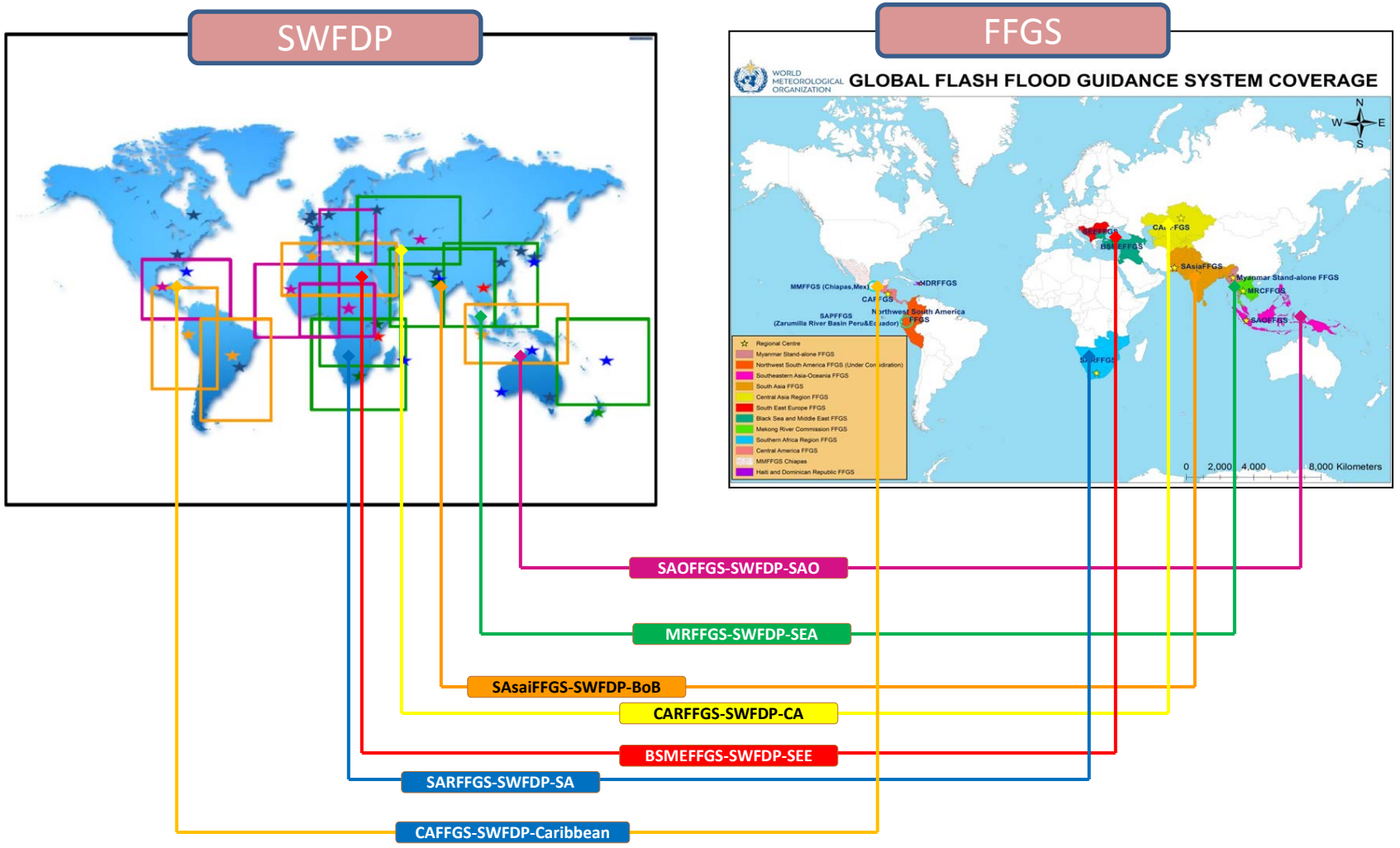



Landslide Susceptibility Mapping




Riverine Routing

# Linkages between SWFDP and Regional FFGS



# Thank you

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| **For more information please visit:** | **http://www.wmo.int/ffgs** |
| | **http://www.hrcwater.org** |

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