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Overview of the Global Flash Flood Guidance System



WMO OMM

World Meteorological Organization

Organisation météorologique mondiale

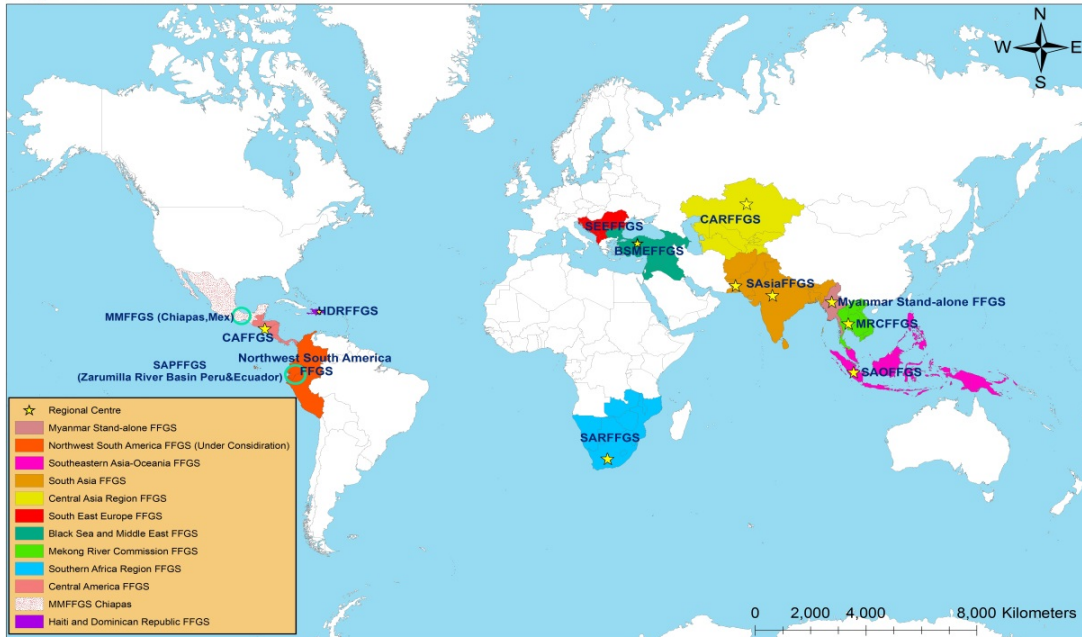
Flash Floods – The most deadly natural (weather-related) disaster in the world

- “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)

WORLD METEOROLOGICAL ORGANIZATION GLOBAL FLASH FLOOD GUIDANCE SYSTEM COVERAGE



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, Singapore, 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 stand-alone FFG System** (under implementation).



Objectives of the FFGS with Global Coverage

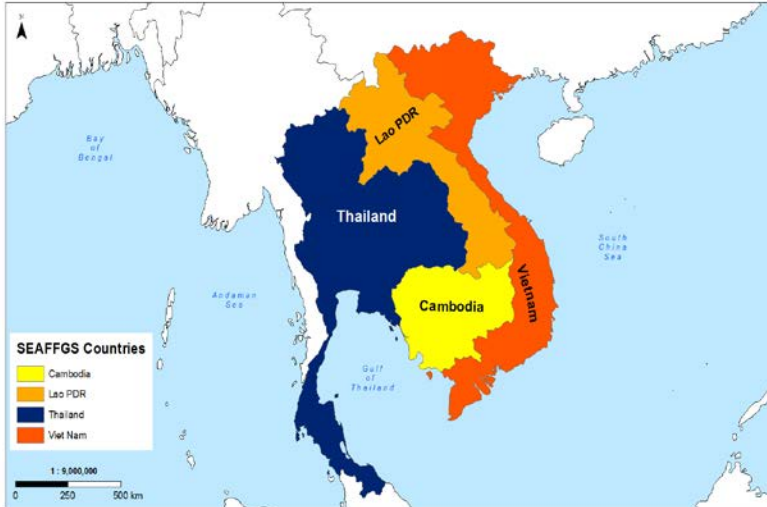
The main objectives of the Flash Flood Guidance System with global coverage are to:

- 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 hydrometeorological 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:



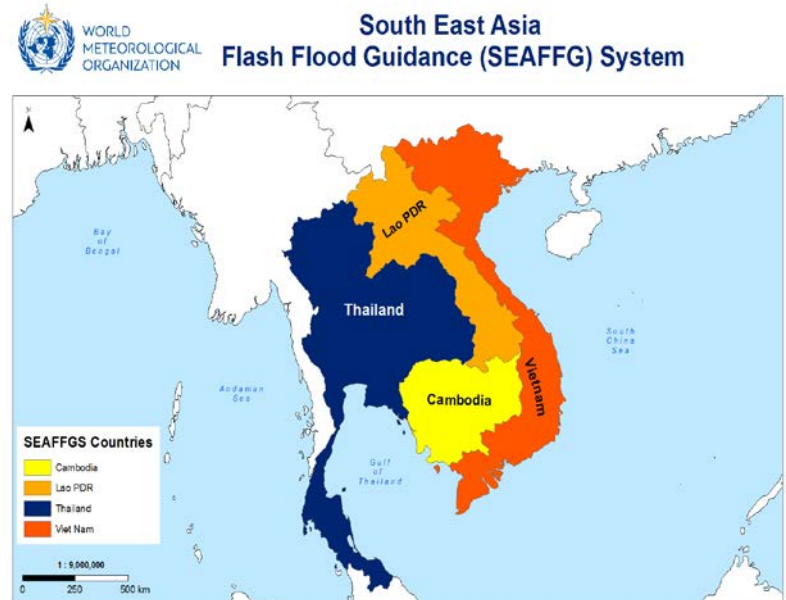
South East Asia
Flash Flood Guidance (SEAFFG) System



- 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.



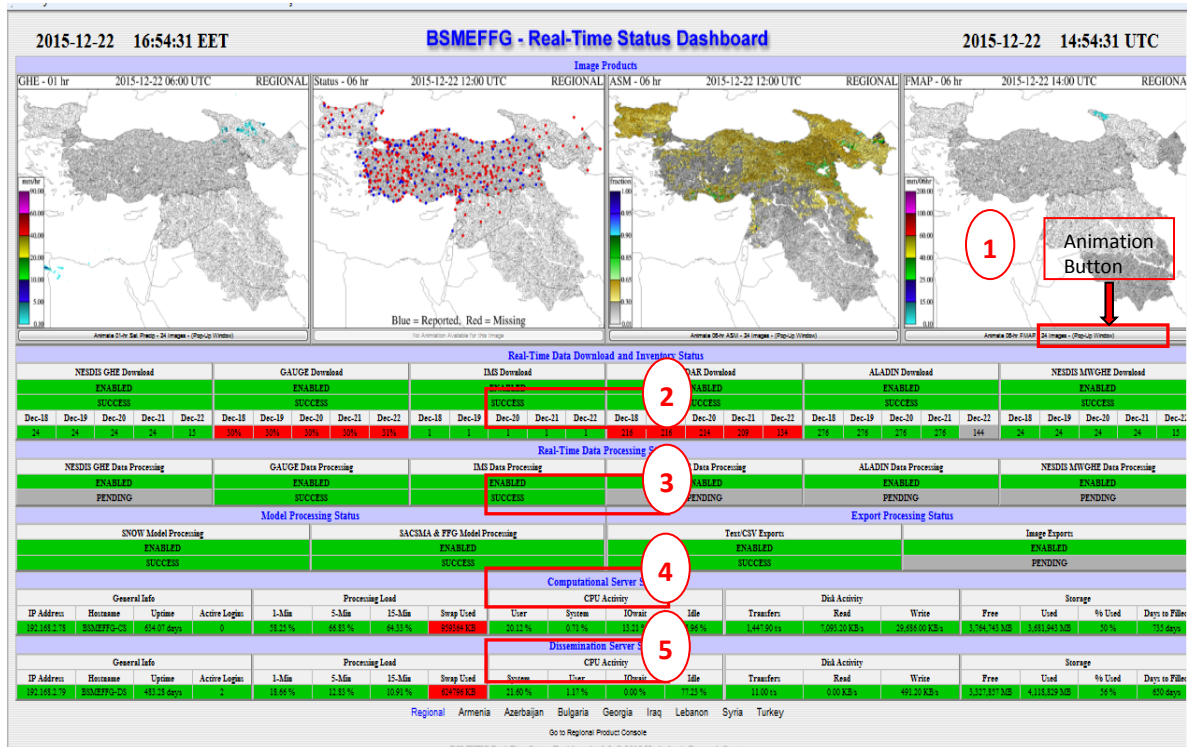
FFGS User Interface

The screenshot shows a web browser window displaying the BSMEFFG Real-Time Product Console. The interface features a navigation menu at the top, a search bar, and a main content area. The main content area is divided into several sections:

- Products, Date and Time Selection Toolbar:** Located at the top of the main content area, it includes fields for Year, Month, Day, Hour, and Minute, along with buttons for selection and refresh.
- Time Interval:** A vertical bar on the left side of the main content area, with a red arrow pointing to it from the left.
- FFGS Products:** A grid of maps showing various products, including Radar, MINGHE, GHE, Gauge MAP, Merged MAP, ASM, FFG, IFFT, PFFT, ALADIN Forecast, FMAP, and FFFT. A green arrow points to this grid from the right.
- Surface Met. Observations:** A table below the grid of maps, showing data for various stations. A red arrow points to this table from the right.
- Snow Products:** A section at the bottom of the main content area, showing maps for Snow Products. A blue arrow points to this section from the right.
- Products Desc. & System Monitoring Toolbars:** A section at the bottom of the main content area, containing navigation and monitoring tools. A red arrow points to this section from the right.

The browser window title is "BSMEFFG Real-Time Product Console Main Product Table - MGM tarafından sağlanan Windows Internet Explorer". The browser address bar shows "https://212.175.180.79/CONSOLE/index.php". The browser status bar shows "Başlat", "Canlı Borsa - Google...", "Inbox (31) - ayhan.s...", "2 Windows Gezgin", "FFG-Özet Rapor - Mi...", "Products Description...", "BSMEFFG Real-Time...", "TR", and "13:09".

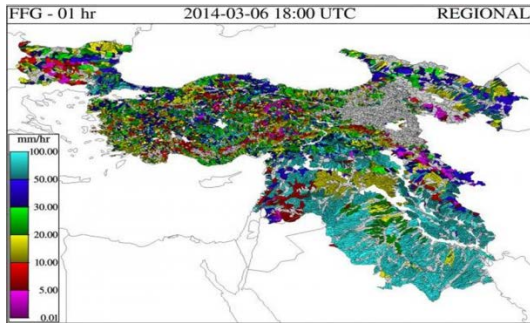
FFGS Dashboard



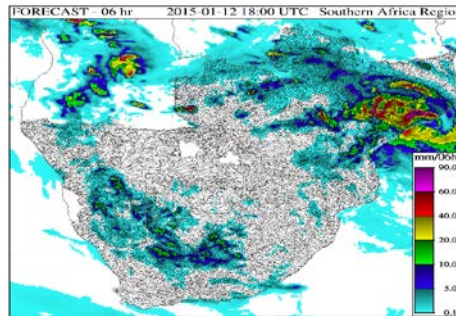
Dashboard is designed to monitor server processes:

- (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.

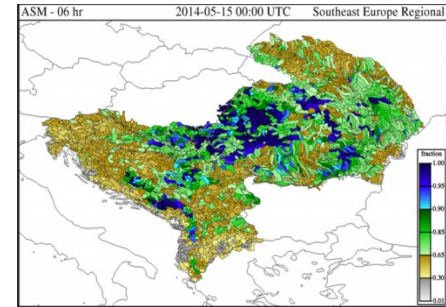
FFGS Products



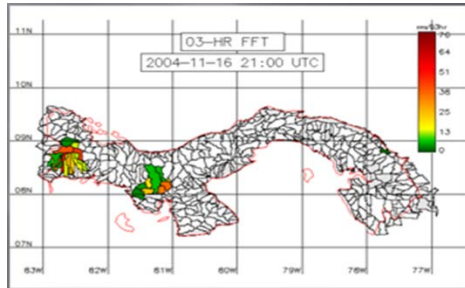
- Flash Flood Guidance for Black Sea and Middle East FFGS.



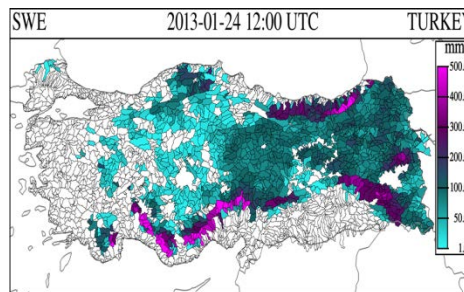
- GHE Satellite precipitation for Southern Africa Region FFGS.



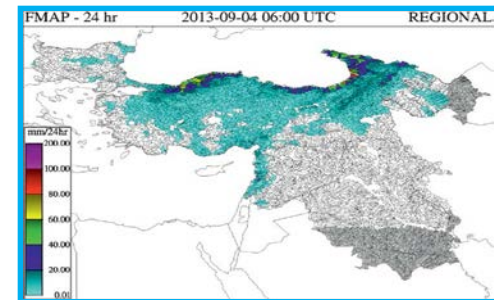
- Average Soil Moisture for South East Europe FFGS.



- Flash Flood Threat for Central America FFGS

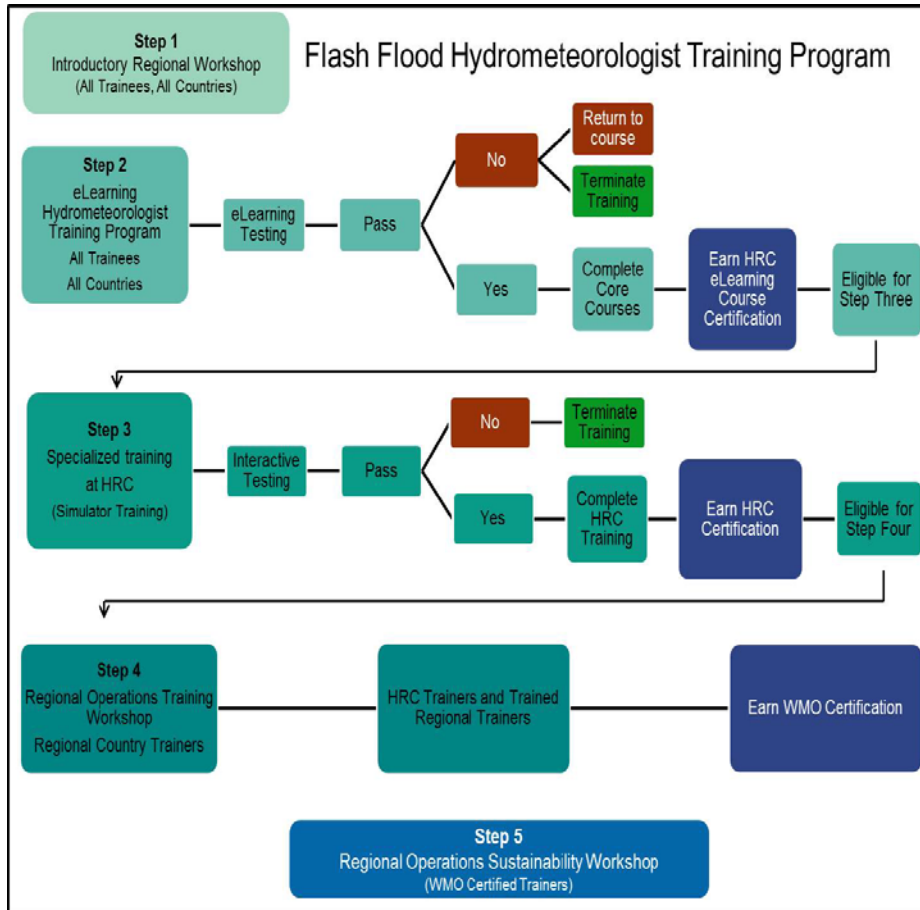


- Snow Water Equivalent (SWE) for Turkey.



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

Training Programme



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

Step-1: Introductory in-country workshops and meetings such as Steering Committee Meetings;

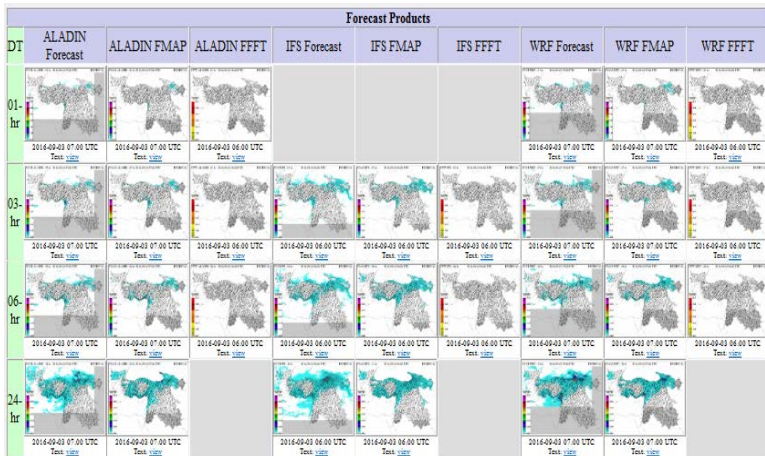
Step-2: On-line eLearning comprises elements of Meteorology, Hydrology, Flash Flood Guidance, GIS, and remote sensing;

Step-3: Advanced operations training at the Hydrologic Research Center (HRC), USA;

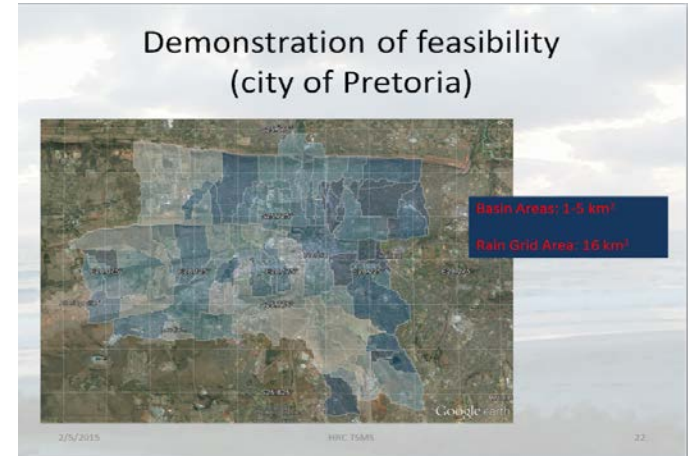
Step-4: Regional operations training workshop toward qualification of WMO flash flood trainer certificate;

Step-5: Regional operation sustainability workshop provided by the WMO certified trainer.

FFGS Advances

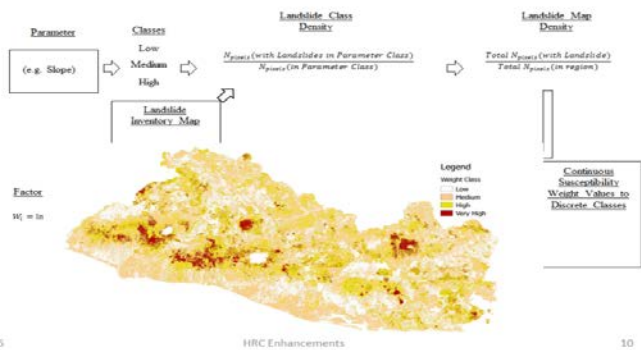


Multi-NWP Model ingestion



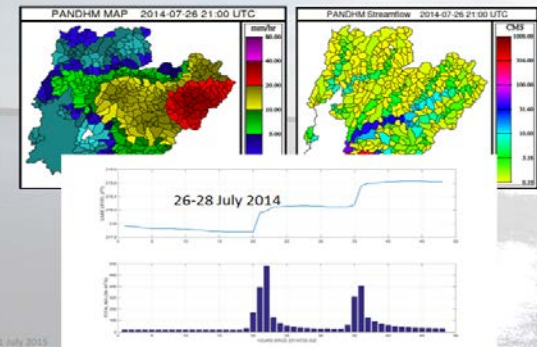
Urban Flash Flood Early Warning System

C.1 Susceptibility Mapping



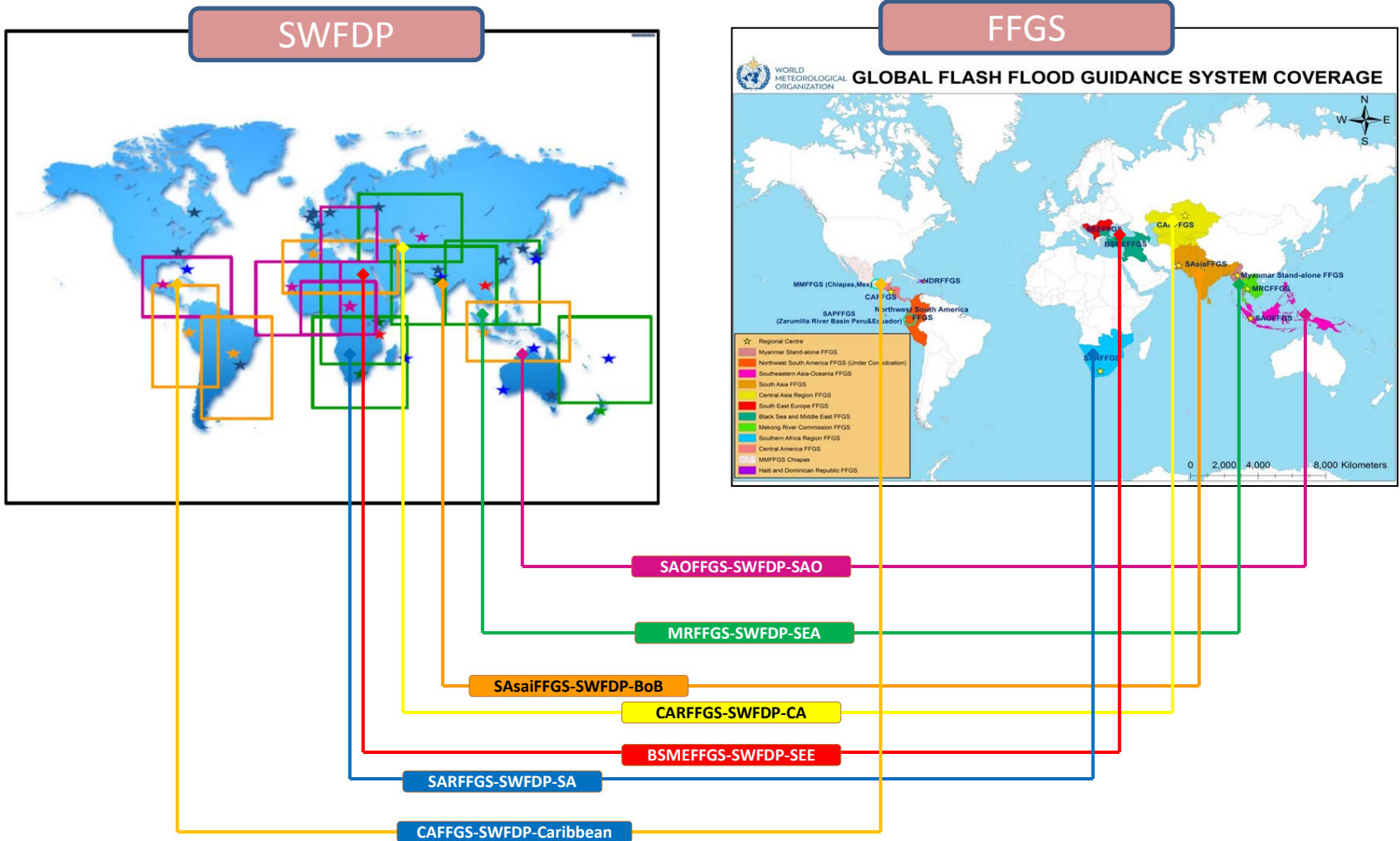
Landslide Susceptibility Mapping

Example Simulation Products



Riverine Routing

Linkages between SWFDP and Regional FFGS



Thank you

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WMO OMM

World Meteorological Organization

Organisation météorologique mondiale

For more information please visit:

<http://www.wmo.int/ffgs>

<http://www.hrcwater.org>