

MEETING OF THE GREAT RIVERS OF THE WORLD

SMART IRRIGATION FROM SOIL MOISTURE FORECAST USING SATELLITE AND HYDRO – METEOROLOGICAL MODELLING

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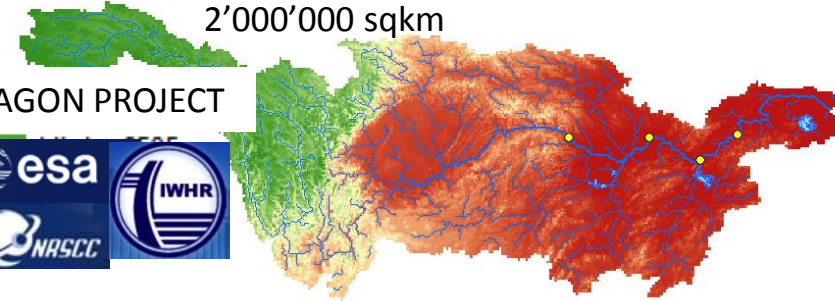
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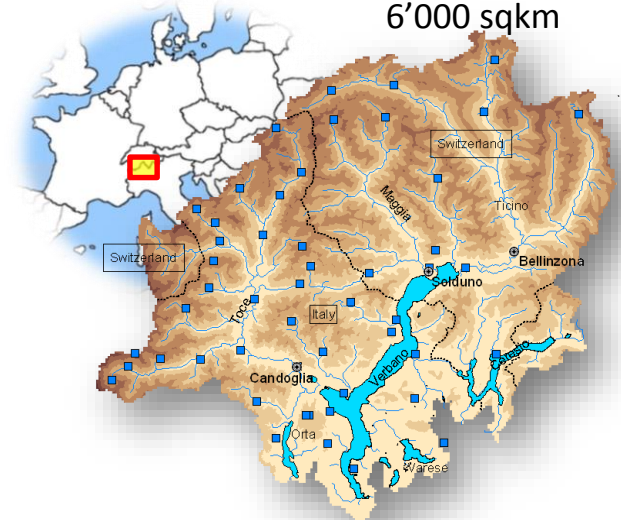
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China: The Yangtze River basin
2'000'000 sqkm

DRAGON PROJECT



Italian – Switzerland Ticino river basin
6'000 sqkm



SIM

www.sim.polimi.it

SMART IRRIGATION FROM
SOIL MOISTURE
FORECAST USING
SATELLITE AND HYDRO –
METEOROLOGICAL
MODELLING

Coordinator:
Politecnico di Milano (Italy)
Team:
Delft University (The Netherlands)
University of Valencia (Spain)
University of Balearic (Spain)
Radi-Academy of Science (China)
University of Tuscia (Italy)
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Water Works

WATERWORKS 2014 COFUNDED CALL

Rome, 23-25 October 2017

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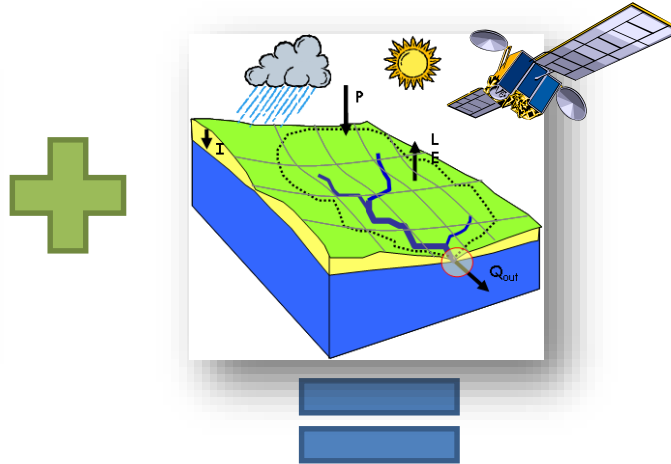


The METHODOLOGY: OPEN DATA FOR COMMON WATER PROBLEMS IDENTIFICATION AND MANAGEMENT

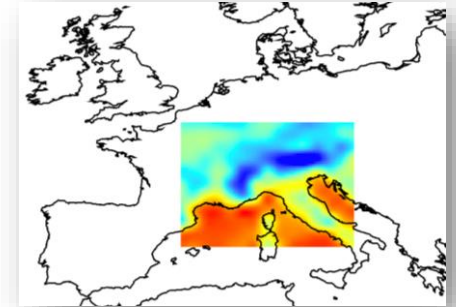
Ground Meteorological Monitoring network



NUMERICAL Modeling and Satellite. Data



Meteorological Forecast Model

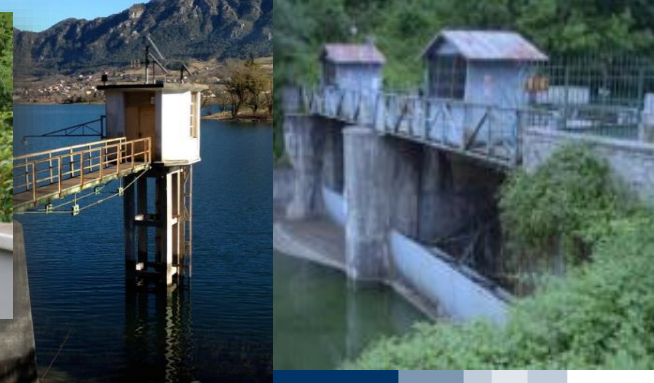


WEB MONITORING AND FORECAST OF SOIL MOISTURE DYNAMIC for SMART MAGEMENT OF

IRRIGATION

FLOOD

RESERVOIR MANAGEMENT





EXAMPLE 1: THE SIM PROJECT (www.sim.polimi.it)

WEB DASHBOARD: REAL TIME MONITORING & FORECAST IRRIGATION WATER NEED

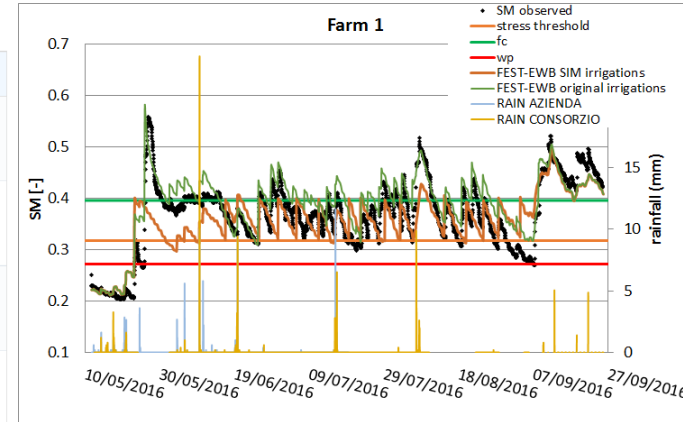
1) Irrigatium consortium area: Present & Metereological forecast

Daily spatial mean for present and forecasted hydro-meteorological outlooks. The "Present" column is computed with observed meteorological data. The highlighted sector refers to interval of hydro-meteorological model outlooks.



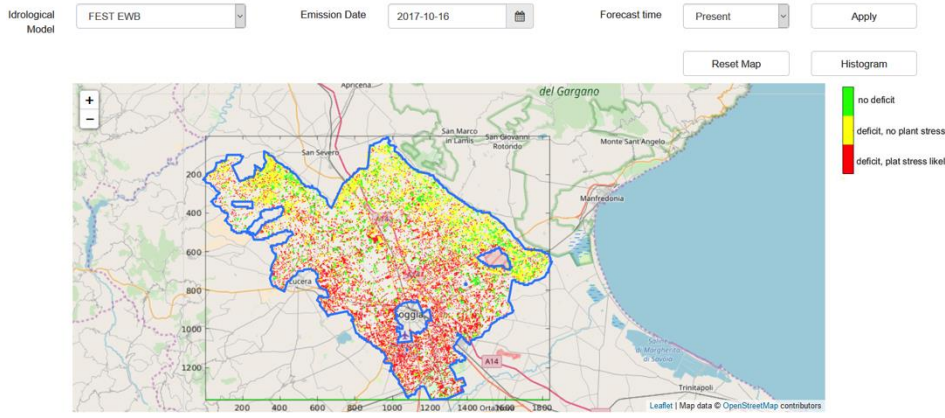
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2) FARM water need with SIM Irrigation strategy



2) Irrigatium Consortium area: Present & Forecast Water Deficit

Meteorological models outputs (RAIN, EVAPET, DOLWA, MOCULT), in green the areas where soil moisture is higher than the field capacity, in yellow the areas where soil moisture is in between the field capacity and the crop stress threshold, in red the areas where soil moisture is below the crop stress threshold.



Evapotranspiration & Soil Moisture Monitoring

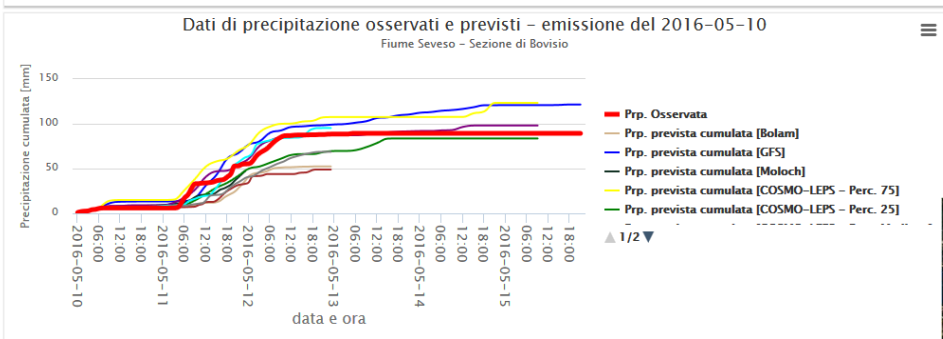




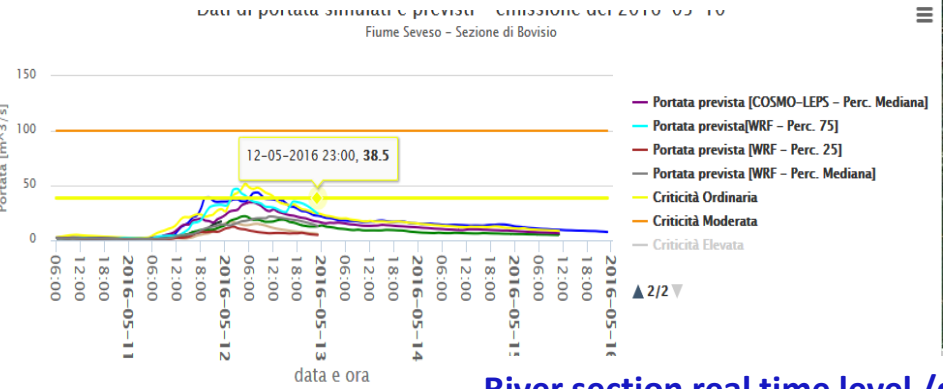
EXAMPLE 2: THE SOL –MOCAP SYSTEM (www.fest.polimi.it/ flood Forecast) WEB DASHBOARD REAL TIME FLOOD MONITORING & FORECAST RIVER NETWORK



Multi-model precipitation forecast

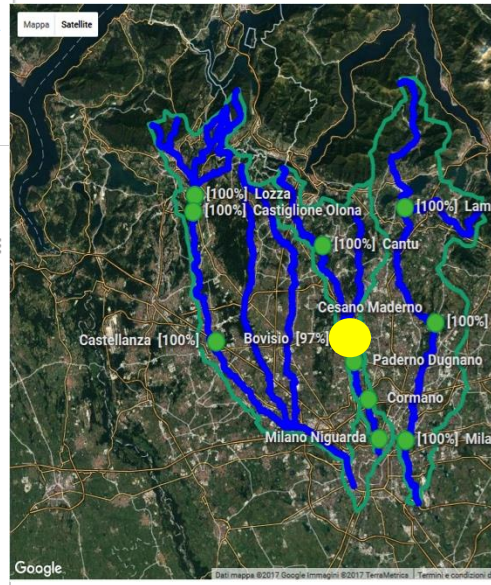


Hydrograph forecasts & discharge thresholds



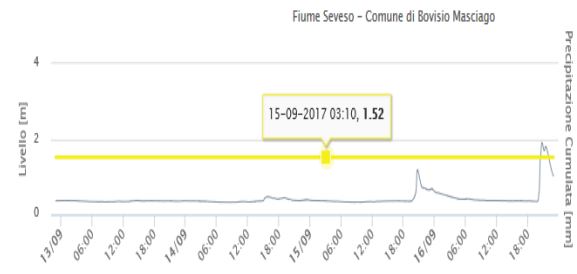
INCREASE TERRITORY RESILIENCE WITH PREVENTIVE PROTECTION ACTIONS OF CITIZENS & WATER AUTHORITIES

The North Milan basin 1400 km²



Stazione	Oggi	Domani	Dopodomani
Lozza	🏠	🏠	🏠
Castellanza	🏠	🏠	🏠
Cantu	🏠	🏠	🏠
Paderno Dugnano	🏠	🏠	🏠
Peregallo	🏠	🏠	🏠
Milano via Feltre	🏠🌊	🏠	🏠
Bovisio	🏠	🏠	🏠
Lambrugo	🏠	🏠	🏠
Castiglione Olona	🏠	🏠	🏠

River section real time level /discharge monitoring



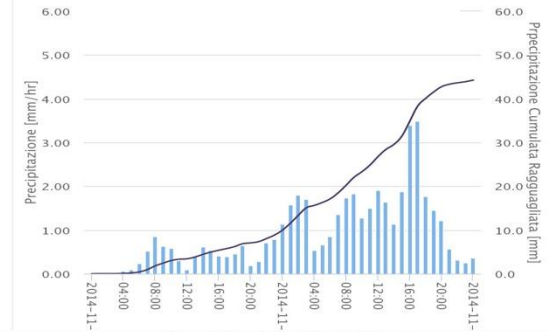


EXAMPLE 3: THE FILL System (<http://131.175.56.133/Idro/login.php>)

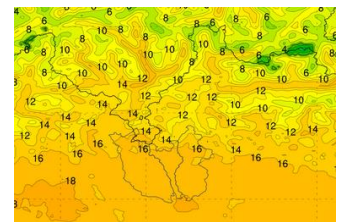


WEB DASHBOARD FOR REAL TIME MONITOR AND FORECAST OF REGULATED RESERVOIR LEVEL AND OUTLET DISCHARGES

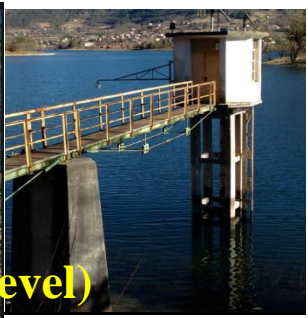
Forecasted Rainfall



Forecasted temperature



FILL (Forecast Idro Lake Level)



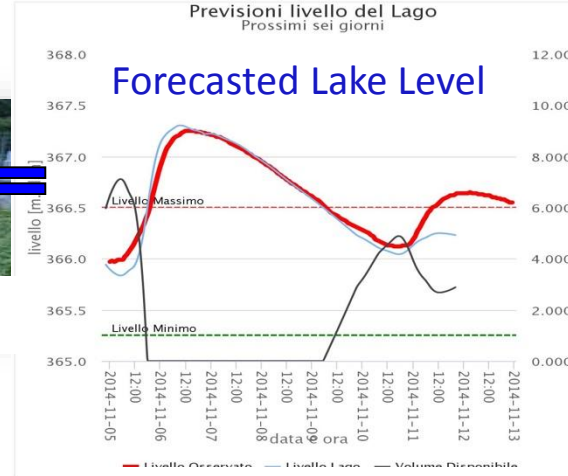
The regulation gates



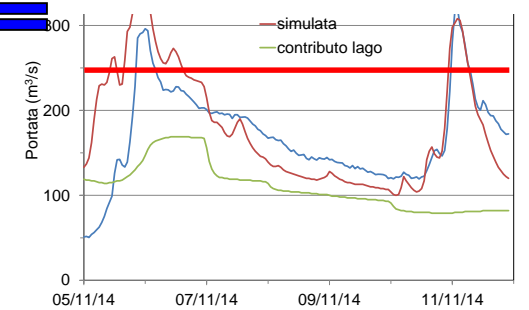
The regulation tunnel



Forecasted Lake Level



Forecasted downstream Discharge



Cosmo-Leps 2016-11-05

Selezionare un modello meteo

Selezionare la data di emissione

Regolazione Traversa Lago

Giorni	1C	2C	3C	4C	5C	6C	7C
Apertura parante (m)	0.2	0.2	0.2	0.2	2.8	2.2	0.2

Regolazione Galleria degli Agricoltori

Giorni	1C	2C	3C	4C	5C	6C	7C
Apertura parante (m)	0.2	0.2	0.2	0.2	2.8	2.8	0.2

Regolare i valori di apertura delle parate direttamente nei grafici. Una volta completata la regolazione premere il pulsante "Elabora dati" per avviare la simulazione.

ATTENZIONE: i tempi di simulazione possono essere lunghi.

LEGENDA MARKERS:
● Opere di Regolazione

AIPo Agenzia Interregionale per il fiume Po

Modellistici e Monitoraggio Idrologico s.r.l.

Basin area: 1473 km²

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CONCLUSION : Ther role of web based real time tools



1) *Web open data and real time hydrologic processes monitoring helps in producing efficient decision-making, risk management and stakeholders information.*

2) *Synergy among water actors based on a web open platforms helps in increasing **actors knowledge** on water problems identification and solving*

National Government

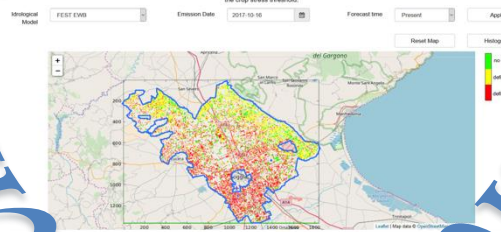
Irrigation Consortia

Civil protection

web real time dashboard

Capitanata sud Fortore agricultural basin: Water deficit

The following map displays the daily mean water deficit obtained coupling a hydrologic model (FEST-EWS or E2-Becker) with several meteorological models outputs (WRF, ECMWF, BOLAM, MOCLO). In green the areas where soil moisture is higher than the field capacity, in yellow the areas where soil moisture is in between the field capacity and the crop stress threshold, in red the areas where soil moisture is below the crop stress threshold.



Farms

Water Authorities

Hydropower

Citizens

System Water Information