Italy-Florida collaboration on Water Science, Culture and Security

Miami, FL

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Outlines

• Research background and solutions

• Rome flood risk management project

• Floodplains (water geomorphic footprint) and human dynamics/perception
DTMs and EO data

Interpolation techniques (data voids)

Spline  TIN  IDW
Terrain analysis

Observing urban and natural features...
...and processes
Hydrologic modelling enforcing geomorphic principles

Spatially Variable Velocity (channel/hillslope)

\[ T_i = \frac{L_h(i)}{V_h} + \frac{L_c(j)}{V_c} \]
Hydrologic modelling enforcing geomorphic principles
Scaling laws/Fractals

hydrogeomorphic watershed analysis
Floodplain modelling and mapping
How do the hydrogeomorphic floodplain behave as respect to standard flood/inundation maps?

Area 17500 km²
Channel flow depths: up to 25 m
Stream network source: 500 km²
Floodplain area: 760 km² to 1455 km²
200 yrs flood maps: 436 km²
Tiber river basin (Central Italy)

Hydrologic-Hydraulic flood maps

HYDROGEOMORPHIC FLOODPLAIN
Applications:
Water res. Management
DSS for water risk
Large scale Culvert conveyance analysis
Hydrologic analysis for mini-hydro potential production
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2D hydraulic routing and flood hazard/risk mapping
Large scale hydro-geomorphic modelling for remediation strategy

Large to local scale hydraulic engineering
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Geomorphic footprint of floods under historical or varying climatic and hydrologic conditions

Floodplain mapping

Upper Mississippi

Mekong River floodplain (Thailand / Laos)

Wabash watershed, USA

Zambezi river basin
WorldPop:
High resolution age-structured population distribution maps
GIS Terrain analysis

WFIUH rainfall-runoff models

Flood Mapping
Thanks for the attention

http://warredoc.unistrapg.it
http://www.wasup-lab.org /

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