Extreme Event Analyses from WaterNet: The NASA Water Cycle Solutions Network

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WaterNet is a new international network of researchers, stakeholders, and end-users of remote sensing tools that will benefit the water resources management community. This paper provides examples of Land Surface Model analyses of extreme events - floods, droughts, and heavy snowstorms in Europe. It discusses the concept of solutions networks focusing on the *WaterNet.* It invites EGU teams to join the in the initial stages of our *WaterNet* network. The NASA Water cycle Solutions Network's goal is to ***improve and optimize the sustained ability of water cycle researchers, stakeholders, organizations and networks to interact, identify, harness, and extend NASA research results to augment decision support tools and meet national needs.*** Our team is developing *WaterNet* by engaging relevant NASA water cycle research resources and community-of-practice organizations, to develop what we term an "actionable database" that can be used to communicate and connect NASA Water cycle research Results (NWRs) towards the improvement of water-related Decision Support Tools (DSTs). Recognizing that the European Commission and European Space Agency have also developed many related research products (EWRs), we seek to learn about these and network with the EU teams to include their information in the *WaterNet* actionable data base. An actionable database includes sufficient knowledge about its nodes and their heritage, so that connections between these nodes are identifiable and robust. Recognizing the many existing highly valuable water-related

science and application networks in the US and EU, we will focus the balance of our efforts on enabling their interoperability in a solutions network context – facilitating access and communications among decision-makers and scientists. We will initially focus on identification, collection, and analysis of the two end points, these being the NWRs and EWRs and water related DSTs. We will then develop strategies to connect these two end points via innovative communication strategies, improved user access to NASA resources, improved water cycle research community appreciation for user DST requirements, improved policymaker, management and stakeholder knowledge of NASA and EU research and application products, and improved identification of pathways for progress. Finally, we will develop relevant benchmarking and metrics, to understand the network's characteristics, to optimize its performance, and to establish sustainability.

Extreme event analysis and prediction is important to water managers, emergency managers-civil defense and local law enforcement, and the public. The paper presents examples from the extreme flash flood event of 18 September 2007 which cost over 250 M Euro in damages to roads, homes, and other infrastructure in the mountains west of Ljubljana. Results from NASA's Global Land Data Assimilation System – Land Surface Model show the precipitation, runoff, and soil moisture simulated in this extreme local flood event highlighting the limitations of coarse grid $1/4$ degree grid and 1 km grid spacing models. Drought simulations over Southeastern Europe also provide examples of model capabilities for drought management decision-making focusing on soil moisture, soil temperature, and precipitation simulations from GLDAS. Extreme snowfall events also pose a serious problem for emergency managers, ski industry and transportation managers. An example of GLDAS simulations of a heavy snow event in the Alps shows the capabilities of GLDAS.

We seek to build on existing partnerships with EU scientific teams that represent a cross-section of individual and networked NWRs, EWRs and DSTs from government, private, and academic domains, that will enable us to quickly establish an operational solutions network, entrain more partner nodes and networks, and move *WaterNet* toward self-sustainability in the US and EU. EU projects like AWARE, and the flood and drought forecasting research efforts (DMCSEE) and GMES projects are potential projects that may directly benefit from this *WaterNet* networking.

Specific goals and objectives, methods of communication, and process to join the *WaterNet* will be discussed.