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The Global Flood Partnership Conference 2017

From hazards to impacts

Salamon P., Brakenridge R., Coughlan de Perez, E., Rudari R., Trigg M., Weerts A., Cohen S., Prados A., Kruczkiewicz A., Baugh C., Gourley JJ., Wu H., Blevins R., Adler R., Snow A., Nelson J., Souffront M., Matgen P., Kettner A., Alfieri L.

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Introduction

From 27 – 29 June 2017, the 2017 Global Flood Partnership Conference was held at the University of Alabama, U.S.A. More than 90 participants attended the conference coming from 11 different countries in 5 continents. They represented 56 institutions including international organisations, the private sector, national authorities, universities, governmental research agencies and non-profit organisations.

The organising committee of the 2017 conference consisted of Robert Brakenridge and Albert Kettner (University of Colorado, Dartmouth Flood Observatory), Erin Coughlan de Perez (Red Cross/Red Crescent Climate Center), Lorenzo Alfieri and Peter Salamon (Joint Research Centre of the European Commission), Mark Trigg (University of Leeds), Albrecht Weerts (Deltares), Ana Prados (University of Maryland Baltimore County) and Sagy Cohen (University of Alabama). Logistic and organisational funding was provided by the NOAA Office of Water Prediction in collaboration with UCAR/COMET and the University of Alabama.

1.1 Objectives of the conference

Each year, floods cause devastating losses and damage across the world. Growing populations in ill-planned flood-prone coastal and riverine areas are increasingly exposed to more extreme rainfall events. With more population and economic assets at risk, governments, banks, international development and relief agencies, and private firms are investing in flood reduction measures. However, in many countries, the flood risk is not managed optimally because of a lack of scientific data and methods or a communication gap between science and risk managers.

The Global Flood Partnership was launched in 2014 and is a cooperation framework between scientific organisations and flood disaster managers worldwide to develop flood observational and modeling infrastructure, leveraging on existing initiatives for better predicting and managing flood disaster impacts and flood risk globally.

The conference theme was “From hazards to impacts” and participants had the opportunity to showcase their latest relevant research and activities. As usual, the advances and success stories of the Partnership were reviewed and the next steps to further strengthen the GFP were discussed.

As in past meetings, participants had numerous opportunities to present their work, exchange ideas, and turn it into a lively and successful meeting. This included a "Marketplace of Ideas" session, "Ignite" talks, Problem-solving session, workshops, poster pitch session and breakout groups.

Review of the advances of the GFP

Peter Salamon from the Joint Research Centre (JRC) Disaster Risk Management Unit and current chair of the GFP steering committee provided an overview of the GFP's advances since the previous annual conference. He reminded the participants of the history and the principal objective of the GFP and pointed out, that during the last meeting a list of action points was agreed upon:

Improving the governance of the GFP: During the last meeting, it was agreed that in order to ensure a sustainable and successful effort towards the identified strategic objectives of the GFP, there is a need to establish a more mature governance structure for the group in the form of a "Steering Group". Based on this requirement terms of reference[1] for a GFP Steering Committee were developed and a number of members, drawn from either academia or already active GFP participants were invited to become members of the steering committee. The GFP steering committee was established in March 2017 and is composed currently of the following members:

Name	Organization
Peter Salamon (Chair)	Joint Research Centre, European Commission
Robert Brakenridge (Vice Chair)	Dartmouth Flood Observatory, University of Colorado
Roberto Rudari	CIMA Foundation
Mark Trigg	University of Leeds
Yang Hong	University of Oklahoma
Erin Coughlan de Perez	Red Cross Red Crescent Climate Centre
Ana Prados	University of Maryland Baltimore County
Albrecht Weerts	Deltares
Sagy Cohen	University of Alabama (Host of the GFP meeting)

Improve the visibility and communication of the GFP: To achieve this objective a number of activities were conducted since the 2016 GFP conference. Most importantly, the GFP website was re-organized and updated by the JRC to better communicate the mission of the GFP, present past and current activities and serve as the principal information source related to the GFP for the public (see Figure 1). All GFP steering committee members are enabled to add content and news to the GFP website.

[1] https://gfp.jrc.ec.europa.eu/sites/default/files/2017-06/SteeringCommittee_Terms_of_Reference_web_version.pdf

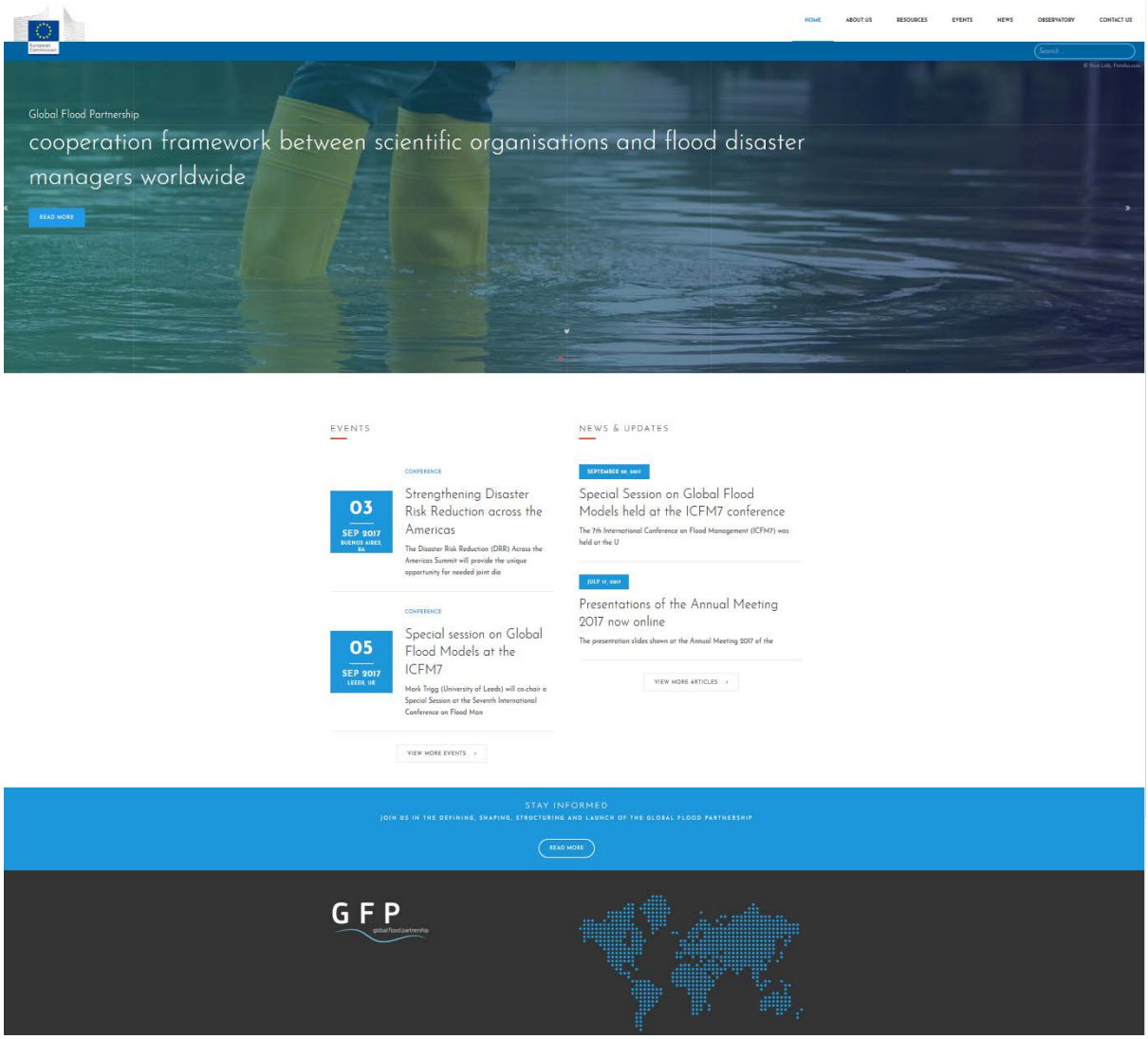

Figure 1 Screenshot of the new GFP website (https://gfp.jrc.ec.europa.eu/)

Furthermore, to strengthen its links to ongoing programs and international initiatives, the GFP is now recognized as Group on Earth Observation (GEO) participating organization. This will facilitate collaboration within GEO and strengthen the GFPs potential contribution to international efforts such as the Sendai Framework for Disaster Risk Reduction or the Sustainable Development Goals. Finally, the GFP was presented and discussed in a session on *Challenges, Opportunities and Advances in Global Flood Forecasting* at the 97th American Meteorological Society Annual Meeting as well as at the *2017 Global Platform for Disaster Risk Reduction*. More contributions to relevant meetings are foreseen in the near future, such as the *7th International Conference on Flood Management (ICFM7)*, *Strengthening Disaster Risk Reduction across the Americas, Understanding Risk 2018* or the *2017 AGU Fall Meeting.*

Better integrate and link to end users: Currently information exchange on available products during a flood event is done normally through a mailing list. Although this has shown to work as was demonstrated through the Malawi flood case in 2015 where various different end users (UN World Food Program, Emergency Response Coordination Center of the European Commission) were provided with relevant information on the flood event from GFP participants, the GFP can further strengthen this information exchange. One possibility, as was proposed, would be to establish a help desk for partners to collaborate and share information on severe floods and to facilitate feedback on the global tools. Peter

Salamon reminded the participants that further discussions on better integrating and linking to end-users are needed and should be discussed during the GFP 2017 meeting.

Continue scientific progress on global flood risk management tools: Fostering the scientific development of global flood risk management tools especially with regard to improving the link between existing global products, the inter-comparison of global models, the focus on flood impact and response, and ways to link local knowledge and data better with global tools remains a key objective of the GFP. Peter Salamon highlighted that with more than 20 presentations, 4 workshops, more than 30 posters, a marketplace and a problem-solving session, the GFP conferences presents a unique opportunity to introduce recent developments, establish networks and collaborations, and bridge the gap between scientists and end-user for global flood risk management tools.

1.2 Flash Floods – Actions and Forecasts

Workshop conveners: Andrew Kruczkiewicz (IRI/RCRCC), Calum Baugh (ECMWF), JJ Gourley (NOAA/National Severe Storms Laboratory)

The main aim of this session was to initiate the conversation of flash floods within the context of the GFP. Leveraging the multidisciplinary participant base at the GFP meeting, we facilitated a session at the interface of forecast development and forecast user focusing not only on improving the skill of forecasts, but also on exploring actions for different types of floods. The session consisted of 3 sub-sessions. Andrew Kruczkiewicz led a sub-session reminding the group about the difference between forecast availability and use. Further, he presented case studies from experiences working with communities vulnerable to various flood types that perception of risk of specific types of floods is usually lacking. Calum Baugh facilitated an interactive exercise on flash flood forecasting. This session, titled, “What are the important elements of flash flood forecasting”, presented various data that could potentially be useful for flash floods forecasting (such as ERICHA, EFI Precipitation, EFI CAPE, ECMWF ENS, HRES 1-3 Day total), and challenged participants to make their own forecasts. One of the main findings of this session was that ensemble based forecasts are difficult to interpret especially in the case of flash floods and that other indicators such as the Extreme Forecast Index (EFI) are difficult for decision making as these indicators are difficult to link to the severity of the impact. Furthermore, considering different products together produced sometimes contradicting information. The comparison to actual historical events can give a valuable context to a forecast, supporting the decision making and additional exposure information, such as population density, was considered a good way to narrow the focus of action from the very coarse outline of the potentially affected area provided by numerical weather predictions. It was also mentioned that considering the change in vulnerability (e.g. time of the day) is especially relevant in the case of flash floods.

JJ Gourley facilitated a presentation on the current limitations of integration of satellite data within flash flood forecasting methods. At present, the role of remote sensing for flash flooding observations remains limited. This is in contrast to the significant use of passive microwave, optical, and active microwave observations used from spaceborne platforms and aircraft to map inundated areas during large-scale river floods. Flash floods typically recede before there is an overpass by a satellite or cloudiness persists following the flash flood, thus limiting the use of optical channels from geostationary platforms.

In the workshop, there was talk of citizen science applications, using insurance claims, and traffic data. Citizen science apps have really proliferated in the universities, private sector, and government. In fact, there is such a wide diversity of these apps that it may be detrimental to getting a wealth of consistent reports in a uniform format.

A significant limitation in improving flash flood forecasting skill is the lack of observations of flash floods. Data from the insurance sector is usually not openly accessible but there might be the possibility to receive traffic data from the departments of transport. This data could be used to find flooded low-water crossings by using traffic data with help from GIS and MRMS (heavy rainfall). There could be a way to automate an algorithm to identify 1) slick/ponded water on roadways and 2) impassible from flooding. The combination of heavy rainfall on a road network (perhaps with a stream crossing and no bridge) and a long time with no moving cars would indicate #2, whereas a slow movement would indicate #1.

1.3 Integration of Remote Sensing-based Flood Information for Enhanced flood mapping

Workshop conveners: Huan Wu, Sun Yat-Sen University, Rob Blevins, Metcom, Robert Adler, University of Maryland

We continued the discussion on the integration of flood information of for better accuracy, completed temporal and spatial coverage, and better understanding of the uncertainty caused by unpresented processes and inputs in hydrologic/hydraulic models and remote sensing retrieval algorithms. The solution of this topical challenges is crucial to address the end user needs and their concerns of flood information on the reliability, clear description of biases, appropriate ways of application of the products, friendly dataset formats etc. Specifically, this year's discussion is focused on the question of how can the GFP facilitate integration of real-time flood information for user organizations and for better understanding? With that question in mind, the group tried to reach a goal of a synopsis of status and future directions on global flood information integration and identification of possible GFP activities to aid in progress.

The most common voice among the participants involved in this discussion is to have Joint Case Studies (JCS) with the idea being initiated in the last year's GFM meeting, while we propose JCS as a scientific task of the Global Flood Partnership group focusing more on event based studies with emphasis on the comparing/integrating of the flood results from numerical models and remote sensing. The participants of the joint case studies will investigate and develop the methodology and techniques on validating flood (mapping and quantitative flood water flow estimation) products with ground truth observations and data, comparing multi-source flood information to understand the difference among products (hydrologic and hydraulic models, remote sensed algorithms) and the deficiency/weakness in the methodologies generating the products, the integration of different products to optimize the flood estimation.

In order to put the proposal into an actionable level, a joint case studies (JCS) group will be appealed to form within the GFP group per interests of its members. The participants will be all volunteers from GFP members (and can also be non-GFP-members with interests). Participants will be requested to provide flood products, ground data, and/or analysis skills depending on what they have and what they can offer. The selection of specific study cases will be performed by the JCS group members, tentatively from the major events that occurred in last a few years with good availability of ground data for verification and previous studies by GFP members. The outputs and knowledge coming out of the retrospective events will be applied to upcoming events. The JCS will also engage user community in the comparison and evaluation process as much as possible. (Particular thanks to Drs. G. Robert Brakenridge, Lorenzo Alfieri, Emily Niebuhr, Marian Muste for their valuable inputs.)

1.4 Web platforms and tools for large-scale forecasting and monitoring

Workshop conveners: Alan Snow (US Army Engineer R&D Center), Jim Nelson, Michael Souffront (Brigham Y. Univ.)

In this workshop, we began the discussion by outlining the way in which the open source web app development Tethys Platform[2] was developed and its capabilities[3,4]. Tethys is developed on the most commonly used web development projects including Postgres, Open Layers, GeoServer, Django all scripted through Python. It lowers the barriers of all that is involved to create spatially enabled web applications for water resource scientists, including the Global Flood Partnership community. It is not the only tool or combination of tools that could be used, but provided an overall framework about which a discussion ensued that included the feedback outlined here.

Generally, the group concluded that having open source is a priority because it makes it easier to implement in organizations that cannot afford expensive proprietary solutions. The group concluded that it was a good platform for enabling data sharing and liked that there were two levels of entry to use. On the one hand applications can be hosted in a central location where there is a concentration of capacity sufficient to maintain and support, while also offering the opportunity for individuals to create their own instances.

Another valuable capability that the discussion on Tethys reflected was the way that REST services had been incorporated in many of the applications. Providing a means to access data programmatically as well as by creating targeted apps significantly enhances the usefulness. Also, the inclusion of maps and simple plots within the apps was recognized as a critical component for the GFP community.

In terms of barriers and concerns about Tethys and open source tools like it are that while lowering a barrier they still require significant technical capacity to develop and maintain apps within a portal. Even though the software is open source the costs are still significant and prohibitive for many organizations that would otherwise have interest in these kinds of solutions.

Some other suggestions included recognition that the system had to be sufficiently responsive (speed) and that there needs to be a long-term plan for an open source project of this magnitude is required to sustain the development. It would also be helpful for training materials, examples, and best practices in application development.

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[2] www.tethysplatform.org

[3] Swain, Nathan R., K. Latu, Scott D. Christensen, Norman L. Jones, E. James Nelson, Daniel P. Ames, Gustavious P. Williams, “A Review of Open Source Software Solutions for Developing Water Resources Web Applications,” Environmental Modeling & Software, Volume 67, pp. 108-117, May 2015.

[4] Swain, N. R., S. D. Christensen, A. D. Snow, H. Dolder, G. Espinoza-Dávalos, E. Goharian, N. L. Jones, E. J. Nelson, D. P. Ames and S. J. Burian (2016). "A new open source platform for lowering the barrier for environmental web app development." Environmental Modelling & Software, Volume 85, pp 11-26.

1.5 Satellite earth-observation based flood mapping

Workshop conveners: Patrick Matgen (Luxembourg Institute of Science and Technology), Albert Kettner (Dartmouth Flood Observatory)

Current state of EO – based mapping: Last several years, EO-based flood mapping products (based on e.g. MODIS, LANDSAT, ENVISAT, SENTINEL-1 and coarse resolution passive microwave sensors) are made available for free by various groups.

State of use of EO – based mapping: Groups involved in mapping have been less successful in truly engaging end users in developing map products. And State-of-use of provided mapping products is mostly undocumented and often difficult to track given the nature of open, freely available products. GFP could take leadership in connecting end users and map developers and champion in both state of the art of mapping techniques and state of its use.

Broad accessibility of EO – based mapping: Accessibility of flood mapping products has become the main problem that users are facing today. Sharing available products through Web Map Services (WMS) or similar OGC based standards should become a priority for the different map providers. Products should be accessible through these APIs to facilitate viewing as well as analyzing of data, and ultimately make it possible to integrate these products into the working practices of end users. Mapping products are not only used by agencies but also of high interest to less experienced GIS users. Information therefore needs to be disclosed through e.g. smartphone applications. WMS has that capability. WMS that facilitate the consultation of the collections (i.e. catalogue of maps) are needed and GFP could support such developments.

It could be a task for GFP to provide access to maps for a broad community of users and to set standards. A “GFP dashboard” hosted on the GFP website could visualize the different freely available products and enable an optimal accessibility of data. The setup of a GFP testbed is recommended to show all types of maps and complementary data (e.g. gauge data, topography, etc.) that are freely available and to make them accessible through state-of-the-art WMS/WFS/WCS like services.

GFP leadership in promoting free available data during & after disaster response: Certain countries can activate the international charter during a natural flooding disaster. Some classified satellite data becomes then available for a small group of experts to derive flood related products. Data sharing limitations on derived and raw data are imposed through current agreements between the satellite data providers and the international charter. This harms the GFP community in various ways, e.g. when identifying flood risk areas. The workgroup proposes to draft a community statement / opinion paper on how all relevant flood data should be compiled and shared and to send it out to other groups working in this field (e.g. unosat, international charter, etc.). The International charter meets every 6 months and it is the working group’s intention to provide this opinion paper for the upcoming charter meeting.

GFP should articulate key messages at the upcoming September 2017 disasters summit in Argentina. This event is an opportunity that can be used to make the broader community rethink the concept of the international charter. The working group suggests writing an opinion piece (“EO for usable mapping”) to explain how the charter maps could become more useful. Data that is shared should not only consist of flood extent information. External data sets such as gauge data, high resolution DEMs, land cover maps, reference maps (“what is normal?”) etc. should be shared as well. The need to provide and visualize metadata such as quality/reliability flags should be articulated as well. The GFP vision on improving accessibility of the data should be articulated as well. GFP should seize this opportunity to lead the discussion.

Database of national contact persons for disaster response: It is recommended that GFP takes a leading role in starting building and maintaining a list of contact persons within national mandating agencies, that can be approached in the event of, and after a disaster

to share NRT flood related data. Currently, products are delivered with a delay if at all, as a reliable contact person should be established during these often-stressful times. Establishing relations with national contact persons in advance also encourages product feedback.

1.6 Problem solving session: What can the GFP do for you?

The main aim of the doctor-patient session was that various actors within the pathway of flood risk management ("doctors") address the questions posed by "patients". Whereas in this session the "patients" were not always also the users of global flood risk management tools, it was suggested that in a future format it should be mainly users that become "patients". This would help to focus on user-driven solutions that the GFP should be working on.

Figure 1 illustrates the "patient" ailments that were addressed by the doctors during this session. It was interesting to see that not one patient took only information from one doctor. This can be interpreted as the people with challenges understood the value of the varied set of expertise of each participant and created a hybrid set of next steps for a way forward from the diverse group.

Another idea that emerged is that some doctors prescribed too much. It may be useful to have staged or tiered prescriptions, identifying what should be done as a first step and what may be useful to be done down the road. This may be more realistic to the way the flood information is applied as there is usually a non-linear path from development of flood information to use.

A lot of the topics that were discussed during the problem solving session were picked up again in the discussion on the future of the GFP (see section 4) and how the GFP could provide added value to solve these problems.

Figure 2: Array of 'patient' ailments, rephrased into questions for the 'doctors' to address. These were sourced from participants who volunteered to posit their challenges and in return receive information from experts

From hazard to impacts: discussion focused on the future of the GFP

On the third and final day of the GFP 2017 conference a session was held on defining actions for the future of the partnership. The title of the session was: “From hazard to impacts: discussion focused on the future of the GFP - Break up sessions”.

Objective: The session aimed at triggering the discussion among participants on future activities of the GFP. How to improve the current status of the partnership was at the heart of the discussion, trying to focus on what failed, what worked on how to proceed from there. The final goal was to have a list of concrete and actionable items to be accomplished in large part at the next GFP conference in 2018.

Format: The session was a breakout session. The moderator introduced the format and aims of the session. After that, the participants were broken out into four groups in order to facilitate the discussion and the listing of items to be included in each group list. Each group was asked to identify at least 3 or 4 priority items to be taken under consideration in a final plenary discussion at the end of the session. Each group had to identify a rapporteur to present the discussion of each group in the plenary audience.

Outcomes: The four groups were diversified in terms pf background and even if similar issues were discussed several different angles came out of the group discussions.

The list prepared by the four groups were very diverse, but it was possible to cluster suggestions under some common topics.

The topics identified are listed below in priority order as discussed in the plenary session:

1. The first discussed item was the current lack of end users’ involvement. This is despite the fact that GFP is a pool of scientists willing to share knowledge with respect to global floods, and that the aim of GSP is to provide actionable research and services for End Users willing to use those services. The following suggestions have been provided:

- To link GFP with the Understanding Risk conference where a good mix between scientists, end users and practitioners; it is considered to be an excellent opportunity to team up with end-users. The personal links of several members of GFP with the UR organizing team can provide an opportunity for a side event next year in Mexico- team up with end users.
- To link GFP with regional meetings of end users. To do that it is necessary to identify and list the most interesting end-user conferences, to prepare material that can be used by participants to the conference to advertise the GFP and invite the end users to actively participate to the GFP.
- To actively invite users to the GFP events exploiting the existing networks of GFP members, starting from the Steering Committee; Re-format the GFP meeting to have the users present their problems proactively; this new format should include table top exercises of events (retrospective) from the end users’ perspective in lessons learned context.
- In the GFP website:
    - List resources and tools, organizing the content from the end users’ perspective
    - Organize a Face page to users with testimonials and case studies
    - Organize webinar series dedicated to users - how to access services or present success stories
- Organize Youth network type activities

2. The second item discussed regards an improved dissemination of GFP activities; the following suggestions have been provided:

- To provide a clear and to the point meeting report diffused in clear through the GFP Website
- To organize a special issue on GFP activities – (e.g. Ahmad Tavakoly (Guest editor))

3. A third discussion was held on practical contributions and actionable science that can be provided by GFP members:

- It was proposed to present an opinion paper on making data (specifically satellite data) available for the community.
- To create a GFP data hub possibly linked to existing hubs (e.g. SERVIR)
- To better define the GFP activations/GFP helpdesk activities: what is the mechanism of activation? In this direction, it was proposed to create a list of contacts in the GFP at National and regional level that would also have a proactive role of end users' engagement. A proposal was made to make a demonstration in the September meeting in Argentina using also remote connections to the GFP members.
- To improve Knowledge transfer via dedicated workshops
- There was a proposal to create common testbeds for the GFP members in order to confront/combine different products/tools and services.

4. The final point relates to the improvement of the partnership aspect. To do that the following was suggested:

- To have a clear list of names contributing to the GFP, including what expertise/resources they are providing to the partnership.
- To buy a domain for the website, like www.GFP.org
- To find a clear motto to be added to the current logo
- To clarify in the website how one can become a member and what this would mean.

Conclusions and recommendations for next steps

The GFP annual meeting 2017 has brought together the scientific community and practitioners on global flood risk models. Progress has been made throughout the year to achieve the objectives set out in the previous meetings. However, some of the objectives set need to be further worked on and future challenges to strengthen the GFP lie ahead.

The list below summarizes some of the key actions to be worked on in the coming years that have been discussed by the participants during the workshops, discussion on the future of the GFP and the problem-solving session.

Continue scientific progress on global flood risk management tools:

Throughout the years, the GFP has built a strong network in the scientific community working on global flood risk management tools. However, to address better user needs and to further promote scientific progress in the field of global flood risk tools the creation of Joint Case Studies (JCS) was proposed. The JCS will investigate and develop the methodology and techniques on validating flood products with ground truth observations and data, comparing multi-source flood information to understand the difference among products, the differences in the methodologies generating the products and the integration of different products to optimize flood estimation. Special attention will be paid to feedback on products from the users and their needs. The JCS can either be topic based (e.g. earth-observation based flood monitoring, global flood forecasting systems) or event based (e.g. Hurricane Harvey). The JCS should also foster knowledge transfer and promote common standards for a better sharing and linking of all relevant flood data.

Better integrate and link to end users:

Similar to last year's outcomes, it was highlighted that the effort to take user needs into account requires more attention. Various actions related to this task should be followed up:

- To organize a table top exercise of an event (retrospective) during the GFP annual meeting to review what models, data and tools are available through the GFP and how those could respond better to end user needs.
- The GFP has currently a mailing list where subscribed participants can request help or information on a specific ongoing flood event. There is a need to better define such "GFP activations/GFP helpdesk activities" with regard to the mechanism of activation and a possible creation of a list of contacts in the GFP at national and regional level including the relevant emergency response authorities.
- Contribute actively to meetings, conferences where a broad range of end users are present (e.g. Understanding Risk, regional meetings, etc.).
- To actively invite and promote the participation of end-users to the annual GFP meetings
- To create a "GFP dashboard" on the website to visualize or link to the different products available. This could also be set up on an event basis, i.e. if a flood happens, GFP participants share their tools, products and information on this specific event through the GFP website.

Improved communication of the objectives and added value of the GFP:

To continue attracting a high level of participation in GFP activities the following was proposed:

- Include a list of names contributing to the GFP, including what expertise/resources they are providing to the partnership.

- Better explain how to become part of the GFP partnership and what is the added value.
- Provide a clear meeting report diffused in through the GFP website.
- Add a list of resources and tools to the GFP webpage, organizing the content from the end users' perspective.
- To organize a special issue on GFP activities or present an opinion paper on specific aspects that the GFP would like to promote (e.g. open data).
- Create a data or information hub on the GFP webpage where GFP participants (information providers and end users) can upload or find relevant information during a flood event.

Appendix

Conference agenda:

Day 1: 27 June 2017

Chair: Peter Salamon

Time	Topic	
08:30 - 09:00	**Registration**	
9:00 – 9:30	**Welcome & Introduction** Chairs GFP: Peter Salamon & Sagy Cohen	
9:30 – 10:20	**Ignite Talks: Global Flood Partnership in Action**	See the talks below (5min each)
10:20 – 11:00	**Coffee break**	
11:00 – 11:20	**Presentation of the National Water Center**	Ed Clark
11:20 – 12:30	**GFP marketplace**	See the program below

12:30– 14:00: Lunch break & Tour of the National Water Center

14:00–15:00	**Presentations – Session 1**	**Speaker**
14:00 – 14:20	A global flood frequency map derived from >10 years of Synthetic Aperture Radar data: concept and first results	Patrick Matgen, LIST
14:20 – 14:40	Methodology for Estimating Floodwater Depths from Remote Sensing Flood Inundation Maps and Topography	Sagy Cohen, U. Alabama
14:40 – 15:00	Earth Observations from Global to Regional Scales for Disaster Risk Reduction and Response	David Green, NASA
15:00 – 15:30	**Coffee break**	
15:30 – 17:30	**Workshop:** Flash Floods - Actions and Forecasts **Organizers:** Andrew Kruczkiewicz (IRI/ RCRCC), Calum Baugh (ECMWF), JJ Gourley (NOAA/National Severe Storms Laboratory)	**Workshop:** Integration of Global Flood Information - satellite, models, gauges and more **Organizers:** Robert Adler (University of Maryland), Robert Blevins (Meteorological Connections, LLC)

Day 2: 28 June 2017

Chair: Robert Brakenridge

Time	Topic	
9:00 – 10:00	**Presentations – Session 2**	**Speaker**
9:00 – 9:20	The NASA Global Flood Mapping System	Fritz Policelli, NASA
9:20 – 9:40	From flood forecast to flood impact maps	Jim Nelson, Brigham Young U.
9:40 – 10:00	Quantitative impact-based multi-model Early Warning System	Roberto Rudari, CIMA
10:00 - 10:20	**Poster Ignite Session**	
10:20 – 11:00	**Poster Session (Coffee served)**	
11:00 – 12:00	**Presentations – Session 3**	**Speaker**
11:00 – 11:20	Global projections of river flood risk in a warmer world	Lorenzo Alfieri, EC JRC
11:20 – 11:40	Avoidance of Flood Disasters and the Benefits of International Cooperation	Robert Brakenridge, DFO
11:40 - 12:00	Understanding the opportunities and challenges in the coastal cities in Akwa Ibom state, Nigeria in a changing climate	Okuku Ediang, Nigerian Met. Ag.

12:00 - Group photo

12:00 – 13:30: Lunch break & Posters & Tour of the National Water Center

13:30 – 15:30	**Workshop:** Web platforms and open source tools for large scale forecasting and monitoring **Organizers:** Alan Snow (US Army Engineer R&D Center), Jim Nelson, Michael Souffront (Brigham Y. Uni.)	**Workshop:** Satellite Earth Observation-based flood mapping **Organizers: (tbc)** Patrick Matgen (Luxembourg Institute of Science and Technology), Albert Kettner (DFO)
15:30 – 16:00	**Coffee break**	
16:00 – 17:30	Problem-solving session: What can the GFP do for you?	Andrew Kruczkiewicz

Day 3: 29 June 2017

Chair: Mark Trigg

Time	Topic	Speaker
9:00 – 10:00	**Presentations – Session 4**	**Speaker**
9:00 - 9:20	Continental modeling at flash flood scale across the U.S.	JJ Gourley, NOAA
9:20 - 9:40	Global Flash Flood Forecasting from the ECMWF Ensemble	Calum Baugh, ECMWF
9:40 - 10:00	High-Resolution Flood Mapping at Regional to Continental Scales	Michael Follum, Coastal and Hydraulics Lab
10:00 - 10:30	National Water Center Summer Institute– program overview and interactions	Sagy Cohen, Jim Nelson, Sarah Praskievicz
10:30 – 11:00	**Coffee break & Posters**	
11:00 - 12:30	**From hazard to impacts: discussion focused on the future of the GFP - Break up sessions**	Roberto Rudari

12:30 – 14:00: Lunch break & Posters

14:00 – 14:30	**Reporting of outcomes from workshops and problem solving session**	Workshop leaders & Problem solving session leader
14:30 – 15:00	**Summary, conclusions, way forward, AOB for the partnership**	Peter Salamon & Robert Brakenridge
15:00	**Closure of the meeting**	

Ignite Talks (27 June 2017 9:30 – 10:20)
Speakers program

#	Time	Title	Speaker
1	9:30 – 9:35	Impact based forecasting	Albrecht Weerts, Deltares
2	9:35 - 9:40	The need for regular monitoring and prediction of ephemeral water bodies in SERVIR regions	Eric Anderson, U. Alabama
3	9:40 - 9:45	Update/Global Flood Monitoring System	Robert Adler, U. Maryland
4	9:45 - 9:50	Evaluation of Probable Maximum Precipitation and Flood under Climate Change in the 21st Century	Shih-Chieh Kao, Oak Ridge Nat. Lab.
5	9:50 - 9:55	Flood mapping for index-based disaster risk transfer and insurance mechanisms	John Galantowicz, AER
6	9:55 - 10:00	GloFAS: a global flood awareness tool available to all	Christel Prudhomme, ECMWF

7	10:00 - 10:05	Experiments in the validation of global flood hazard models for two African countries	Mark Trigg, U. Leeds
8	10:05 - 10:10	A Global Database of Historic Flood Events	Colin Doyle, Cloud to Street
9	10:10 - 10:15	A new high-resolution flood modeling framework for the Mississippi Basin using SWAT and LISFLOOD	Adnan Rajib, US EPA
10	10:15 - 10:20	The NOAA Joint Polar Satellite System Flood Product	Bill Sjoberg, NOAA JPSS Program

GFP marketplace (27 June 2017 11:20 – 12:30)

Title	Moderators
GLOSSIS/GLOFFIS viewer	Albrecht Weerts, Shristi Vaidya, Deltares
Global Flood Monitoring System (GFMS)	Robert Adler, University of Maryland
Globally Aware, Locally Precise - U.S. Army Military Hydrology Team	Michael Follum, Mark Wahl, Coastal and Hydraulics Laboratory
The Global Flood Awareness System	Peter Salamon, JRC Christel Prudhomme, ECMWF
Flood mapping from Earth Observations	John Galantowicz, AER Colin Doyle, Cloud to Street Bill Sjoberg, NOAA JPSS Program
Open source applications for streamflow forecasting and flood warning	Alan Snow, US Army Engineer Research and Development Center Jim Nelson, Brigham Young University
Prototypes for Information and Decision Support Systems	Marian Muste, Iowa Flood Center

Poster program

Title	Presenter
A first-response streamflow forecasting tool to provide continental hydrologic awareness with local precision	Ahmad Tavakoly, Coastal and Hydraulics Laboratory
The value of a model for flood disaster assistance	Guy Schumann, Remote Sensing Solutions
NASA Disaster Response for Flood Events	John Murray, NASA
Flood Communication Innovations	James Halgren, RTI International
Providing timely hydrologic information in data sparse areas	Mark Wahl, U.S. Engineer Research and Development Center

Enabling early action by focusing on partnerships among Critical Infrastructure Networks	Shristi Vaidya, Deltares
Urban flood modelling and suggestions for flood resilience	Asheesh Sharma, CSIR-National Environmental Engineering Research Institute
The U.S. Flood Inundation Map Repository (USFIMR): Methodology and Future Development	Dinuke Munasinghe, University of Alabama
An Operational Global System for Forecasting Point-Rainfall and Flash Flood Risk	Fatima Pillosu, ECMWF
A High Resolution Analysis of Heavy Rain Events in Anchorage, AK	Emily Niebuhr, NOAA NWS
The effect of river bathymetry on riverine flood simulations	Mariam Khanam, University of Alabama
GloFAS as a flood alert system in Acre civil defense	Marcio Moraes, CEMADEN
Addressing the false dichotomy of the 100-year flood zone map with a gradient-based flood map using paleohydrologic principles.	Rachel Lombardi, University of Alabama
Linking severity thresholds predicted by GloFAS to flood stages at the local scale	Conrado Rudorff, CEMADEN
FloodList.com: A realtime database of global flood events from media reports	Calum Baugh, ECMWF
Towards impact-based flood forecasting and warning in Bangladesh: a case study at the local level in Sirajganj district	Albrecht Weerts, Deltares
Global to local hazard and impact forecasting	Albrecht Weerts, Deltares
Continental scale data assimilation of discharge and its effect on flow predictions	Albrecht Weerts, Deltares
The limits of Funes	Herman Dolder, Aquaveo LLC
Integrated modeling for high resolution flood inundation mapping	Venkatesh Merwade, Purdue University
Spatio-temporal patterns of flooding in rivers of the Eastern United States over the last 10,000 yrs	Lisa Davis, University of Alabama
Tree-Ring Records of Lower Mississippi River flooding	Matthew Therrell, University of Alabama
Producing High-Resolution Flood Extent Maps from Civil Air Patrol Imagery after Hurricane Mathew 2016	Zhe Jiang, University of Alabama
Hydrological evaluation of multi-source Quantitative Precipitation Estimation (QPE) products and their impacts on physically based flood modeling	Huan Wu, Sun Yat-Sen University
Development and Applications of a New Global Scale River Slope Layer	Md Tazmul Islam, University of Alabama
A physically-based global flood zone map	Yasir Kaheil, FM Global
Benchmarking an operational procedure for rapid flood risk assessment in Europe	Peter Salamon, European Commission - JRC
Linking Flood Forecasting and Satellite Rapid Mapping	Peter Salamon, European Commission - JRC

A framework for global flood hazard mapping	Lorenzo Alfieri, European Commission - JRC
A Multi-Scale Ensemble-based Framework for Forecasting Compound Coastal-Riverine Flooding	Firas Saleh, Stevens Institute of Technology
High-Resolution Maps for Index-Based Flood Insurance: the ARC River Flood Model (AFM-R)	Elke Verbeeten, African Risk Capacity

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