

# International Association of Hydrological Sciences -IAHS

## Activities' Report - Year 2019

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### 1. Introduction

The Italian research activity referring to the International Association of Hydrological Sciences (IAHS) has been carried out by the scientific community that refers to hydrological sciences, hydraulics and hydraulic works. In this context, the most relevant initiative carried out in 2019 can be identified by the activities of:

- a) *International Commission on Water Resource (ICWR/IAHS)*, <https://iahs.info/Commissions--W-Groups/ICWRS-Water-Resources-Systems.do>. ICWR/IAHS is aimed to promote research development on the integration of all phases of water resource protection, planning, design, management, operation and utilization. Alberto Montanari is past president of the Commission.
- b) *International Commission for Ground Water (ICGW)*, <https://iahs.info/Commissions--W-Groups/ICGW-Groundwater.do>, chaired by Prof Aldo Fiori (Università Roma Tre), addressed to the advancement of the science of groundwater hydrology, including the scientific basis for groundwater resource assessment and groundwater management. It is also responsible for helping to bridge the gap between science and practice
- c) *International Commission on Statistical Hydrology (ICSH/IAHS)*, <https://iahs.info/Commissions--W-Groups/ICSH-Statistical-Hydrology.do>, past-president Prof. Salvatore Grimaldi and past-secretary Prof. Elena Volpi. In July 2019 the Prof. Elena Volpi has been elected president-elect and Dr. Ilaria Prodocimi (University of Venice Ca' Foscari) has been elected Secretary. The activities of the commission are focused on the development of new statistical methods and tools for hydrological applications.
- d) *MOXXI Working Group (Measurements & Observations in XXI Century)*, <https://iahs.info/Commissions--W-Groups/Working-Groups/MOXXI.do>, chaired by Dr. Flavia Tauro (University of Tuscia), with the task to promote the advancement of novel observational techniques that leads to new sources of information to help better understand the hydrological cycle.
- e) *International Commission on Continental Erosion/International Association of Hydrological Sciences (ICCE/IAHS)*, <https://iahs.info/Commissions--W-Groups/ICCE-Continental-Erosion.do>, of which Prof. Porto (University Mediterranea of Reggio Calabria, Italy) was Secretary from 2011 to 2019 (2 terms). Prof. Porto was elected President-elect of ICCE in July 2019 within the 27th IUGG General Assembly held in Montreal, Canada. The activity of the Commission deals with problems related to soil erosion and deposition at both hillslope and catchment scale, fingerprinting techniques, sediment transport and the use of tracers techniques to establish the sediment budget of large areas.
- f) *International Commission on Surface Hydrology (ICSW)*, <https://iahs.info/Commissions--W-Groups/ICSW-Surface-Water.do>. The activities of the commission are focused at promoting research into surface hydrology and its interaction with other aspects of the hydrological cycle."
- g) *Citizen AND HYdrology Working Group (CandHy WG)*, <https://iahs.info/Commissions--W-Groups/Working-Groups/Candhy.do>, presided by Dr. Fernando Nardi, aims to stimulate discussion, sharing of knowledge, information, data, ideas fostering scientific and professional exchange of academic, institutional and citizen communities interested in the "Citizen AND HYdrology" topic. CandHy seeks to discover the potential of citizen involvement and crowd sourced data for advancing hydrologic research in water resource and risk management, hydro-climatic risk mitigation and disaster preparedness.

- h) *Società Idrologica Italiana (SII)*, [www.sii-ihs.it](http://www.sii-ihs.it), belonging to the international network of IAHS's scientific associations, <https://iahs.info/Links/National-and-Regional-Hydrological-Associations.do>, presided by Dr. Tommaso Moramarco (alternate National IAHS Representative), addressed to advance interest and scholarship in scientific and applied aspects of hydrology and foster members involvement in relevant national and international professional activities.

Moreover, Elena Toth was involved in the development of the “23 Unsolved Problems in Hydrology” (UPH) IAHS initiative inside the EGU community and part of the drafting team (13 authors) of the community paper.

In addition, it is extremely important to highlight that during the IUGG General Assembly (Montreal, Canada| July 8-18, 2019), Prof. Salvatore Grimaldi, Università degli Studi della Toscana, was elected Vice-President of the International Association of Hydrological Sciences. As Vice-President of IAHS is actively participating in the organization and planning of the initiatives related to the ICSH Commission and MOXXI and CANDHY Working Groups. Salvatore Grimaldi is also member of IUGG Union Commission on Mathematical Geophysics (CMG). During last IAHS bureau submitted the proposal to host in Rome the event to celebrate the IAHS 100 anniversary. The IAHS bureau approved it and the event is expected on 2022.

Finally, there has been a very relevant research activity carried out by Italian institutions within IAHS and in particular within IAHS research initiatives. The Italian community also played an important role in the consultation process that is leading to the preparation of the new IAHS Decade 2013-2022 “Panta Rhei – Everything Flows”.

## **2. Main activities carried on by IAHS during 2019 relevant for Italy and for CNR**

The most relevant activity developed in the period 2019 is related to the activities mentioned in section 1. Specifically, the main actions can be identified as follows.

### **2.1 Organization of conferences, workshops 2019**

- EGU-General Assembly 2019, Vienna 7-12 April, 2019, HS7.7/NH1.18: Hydrometeorologic variability: spatio-temporal scales and probability of extremes (co-organized) PICO session (co-organized by ICSH-IAHS) <http://meetingorganizer.copernicus.org/EGU2019/session/26630>
- AGU 2019 – San Francisco, California, Session: H078 - Hydrological Connectivity Between Headwaters to Groundwaters in a Changing Climate. Convener: Erica Woodburn; Co-Conveners: Laura Foglia, Ate Visser, Ned Bair (<https://agu.confex.com/agu/fm19/prelim.cgi/Session/82325>).
- 27 IUGG General Assembly 2019 (co-organized by ICSH-IAHS), Montreal, Canada| July 8-18, 2019 100th anniversary of IUGG, <http://iugg2019montreal.com>. The commission ICSH-IAHS has proposed and organized the following sessions:
  - o H25 – Quantifying uncertainty in hydrologic systems: A Bayesian point of view. Convener: Dmitri Kavetski (Australia), Co-Conveners: Jasper Vrugt (USA), Mark Thyer (Australia), Lucy Marshall (Australia), Elena Volpi (Italy)
  - o H26 – Hydrologic time series with contributions on methodologies, applications, assessment and alternatives for nonstationarity, and assessment of uncertainty Convener: Saman Razavi (Canada), Co-Conveners: Demetris Koutsoyiannis (Greece), Krzysztof Kochanek (Poland), Seth Westra (Australia), Ebru Eris (Turkey), Yuanfang Chen (China), Dong Wang (USA), Uwe Haberlandt (Germany), Alin Carsteanu (Mexico), Elena Volpi (Italy), Hafzullah Aksoy (Turkey)
  - o H27– Multivariate statistics for hydrological application, Convener: Salvatore Grimaldi (Italy), Co-Conveners: Taha Ouarda (Canada), Andras Bardossy (Germany), Amir AghaKouchak (USA), Salvatore Grimaldi (Italy)
  - o H28 – Contributions to unsolved problems in statistical hydrology, Convener: Ashish Sharma (Australia), Co-Conveners: Elena Volpi (Italy), Salvatore Grimaldi (Italy), Yuanfang Chen (China), Ebru Eris (Turkey), Krzysztof Kochanek (Poland).
- 27 IUGG General Assembly 2019, Montreal, Canada| July 8-18, 2019 100th anniversary of IUGG, <http://iugg2019montreal.com>. The commission ICCE-IAHS has proposed and organized the following sessions:

- H02 – Using Fingerprinting and Modelling Techniques to Explore Transfer and Connectivity in Catchment Sediment Systems, Convener: Adrian Collins (UK), Simon Pulley (UK), Co-Conveners: Ian Foster (UK), Allen Gellis (USA), Paolo Porto (Italy)
- H03 – Land Degradation Due to Natural and Anthropogenic Drivers: Impacts on Runoff, Soil Erosion and Sediment Yield at Multiple Scales, Convener: Paolo Porto (Italy), Co-Conveners: Kazimierz Banasik (Poland), Sergey Chalov (Russia), Adrian Collins (UK), Michael Stone (Canada)
- H04 – Source, Transport and Fate of Cohesive Sediment in Aquatic Systems: Implications for Water Quality and Ecosystem Health, Convener: Michael Stone (Canada), Co-Conveners: Adrian Collins (UK), Sergey Chalov (Russia), Paolo Porto (Italy).
- 27 IUGG General Assembly 2019, Montreal, Canada| July 8-18, 2019 100th anniversary of IUGG, <http://iugg2019montreal.com>. La commissione ICGW-IAHS has proposed and organized the following sessions:
  - H13 – Advancements in Modeling and Characterization Of Aquifer, Convener: Corinna Abesser (UK), Co-Conveners: Felipe de Barros (USA), Alberto Bellin (Italy), Aldo Fiori (Italy), Antonio Zarlenga (Italy)
  - H23 – Innovative ICT Tools for Water Management and Science, Convener: Laura Foglia (USA), Co-Conveners: Berit Arheimer (Sweden), Andrea Brookfield (USA), Mary Hill (USA), Rudy Rossetto (Italy), Melody Sandells (UK)
  - H20 – Predictions in Ungauged Basins: What’s New?, (co-organized with ICSW), Convener: Thomas Skaugen (Norway), Co-Conveners: Gil Mahe (France), Aldo Fiori (Italy), Nilay Dogulu (Turkey), Michelle Newcomer (USA), Honeyeh Irvani (UK).
- 27 IUGG General Assembly 2019, Montreal, Canada| July 8-18, 2019 100th anniversary of IUGG, <http://iugg2019montreal.com>. Elena Toth organized the following session:
  - UPH special session HS01 “Unsolved Problems in Hydrology (UPH)” (10 July from 18:15, room 511), co-convener Elena Toth
- 27 IUGG General Assembly 2019, Montreal, Canada| July 8-18, 2019 100th anniversary of IUGG, <http://iugg2019montreal.com>. The MOXXI Working Group organized the following session:
  - MOXXI: Innovation and Multidisciplinarity to Observe Earth Processes (IAHS, IAMAS) / Citizen Science and Crowdsourced Data in Hydrology for Water Risk Management, Communication and Awareness (IAHS). Conveners: Flavia Tauro, E. Mario Mendiando, Andy Wickert.
- 27 IUGG General Assembly 2019 (co-organized by ICSH-IAHS), Montreal, Canada| July 8-18, 2019 100th anniversary of IUGG, <http://iugg2019montreal.com>. The Working Group MOXXI organized the session:
  - JH05 - Citizen Science and Crowdsourced Data in Hydrology for Water Risk Management, Communication and Awareness (IAHS). Convener: Fernando Nardi (Italy, IAHS). Co-Conveners: Jan Seibert (Switzerland, IAHS), Woutert Buytaert (UK, IAHS), Hongchao Fan (China, IAHS), Wahrmann Vargas Cristina (Costa Rica, IAHS), Anil Mishra (UNESCO), Dominique Bérod (WMO).
- ICSH-STAHY Workshop 2019 (organized by ICSH-IAHS), Nanjing, China | October 19-20, 2019: The 10th edition of the STAHY International Workshop has been organized by the Hohai University (Prof. Yuanfang Chen, <http://www.stahy2019.org/>).
  - The day before the conference (October 18, 2019) the Early Career Course for early career members has been organized by Svenja Fischer, Early Career Committee Representative of IAHS-STAHY (<https://younghs.com/>)
  - During the conference the STAHY Best Paper Award 2019 has been awarded to Laura K. Read, National Center for Atmospheric Research, Boulder, Colorado, USA and Richard M. Vogel, Department of Civil and Environmental Engineering, Tufts University, Medford, Massachusetts, USA, for the article: Read, L.K., and Vogel, R.M. (2015). *Reliability, return periods, and risk under nonstationarity*. *Water Resources Research* 51.8: 6381-6398, doi: 10.1002/2015WR017089.
- The Working Group MOXXI, the Working Group CANDHY with WMO, organized the workshop.
  - 2019 Moxxi, Candhy, WMO Hydrohub, and CUASHI Joint Conference Innovation in Hydrometry: Overcoming Barriers to Operationalization, held in New York (March 11-13, 2019).
- 10th anniversary of SII Foundation and Hydrology Days of SII 2019, University of Bologna Alma Mater Studiorum, Bologna 16-18 September, organized by the Italian Hydrological Society ([www.sii-ihs.it](http://www.sii-ihs.it)). The event involved researchers, public administrations and companies.

## 2.2 Organization of scientific initiatives 2019

- Training programs on *Non-contact river discharge estimation techniques* sponsored by the Ministry of Water Resources and Ganga Rejuvenation, Government of India and organized by The National Hydrology Project (NHP), the World Bank assisted and the Indian Institute of Technology with the collaboration of the Alternate national rep IAHS, Tommaso Moramarco, Roorkee, June 2019
- Florisa Melone Award 2019 promoted by the Italian Hydrological Society to a research project developed by young Italian researchers. The Award is dedicated to the memory of Florisa Melone, CNR Head Researcher of the Research Institute for Geo-Hydrological Protection. The award consists of 5,000 € and Dr. Marco Peli was bestowed for the project "*Profiles: Water—driven dynamics of heavy metals in anthropogenically—enriched soils*".
- *The MOXXI working group* is keeping increasing its visibility and is actively participating in the recently approved COST project: "*HARMONIOUS – Harmonization of UAS techniques for agricultural and natural ecosystems monitoring*". The project is led by MOXXI's friend Dr. Salvatore Manfreda.
- IAHS initiative inside the EGU community promoted by Elena Toth, President of the EGU Hydrological Sciences division (EGU HS): "23 Unsolved Problems in Hydrology" (UPH). The Chairs of the EGU-HS nine SubDivisions (SD) were invited to: i) present the initiative to their members and discuss by email exchanges, contributing to the IAHS LinkedIn forum. The paper "Twenty Three Unsolved Problems in Hydrology – a Community Perspective" by Blöschl et al., 2019 was published on Hydrological Science Journal (<https://www.tandfonline.com/doi/full/10.1080/02626667.2019.1620507>).
- 2019 MOXXI, CANDHY, WMO HydroHub, and CUAHSI Joint Conference: "Innovation in Hydrometry: Overcoming barriers to operationalization". The Conference held to New York University, NY USA, March 11-13.
- CANDHY working group activities has developed since its 2017 July inception by increased participation and involvement in thematic conferences and workshops involving experts through person-to-person invitations (currently, CANDHY includes 40+ "friends" from more than 10 countries).
- Elena Toth has been main organiser of the meeting of the Italian Hydrological Society "Decennale e Giornate dell'Idrologia 2019", "L'idrologia al servizio dei cittadini: tra emergenze e gestione delle risorse idriche", Bologna, 16-18 settembre 2019, sponsored by IAHS.
- Pierluigi Claps organised the GEOframe NewAGE Winter school, 8 - 18 January 2019. The course for doctoral students, post docs and young researchers in Hydrology, Forestry, and related disciplines has dealt with the simulation of the hydrological cycle of catchments of various sizes with the GEOframe system.

## 2.3 Editorial Board Participation

### *IAHS Hydrological Sciences Journal*

- Attilio Castellarin: Editor in Chief dal 2017 (Co-Editor dal 2015), Università di Bologna
- Aldo Fiori, Co-Editor, Università Roma Tre
- Marco Borga, Guest Editor, Università di Padova
- Alessio Domeneghetti, Associate Editor, Università di Bologna
- Andrea Petroselli: Associate Editor, University of Tuscia
- Flavia Tauro: Associate Editor, University of Tuscia
- Elena Volpi: Associate Editor, Università Roma Tre
- Fernando Nardi: Guest Editor of the Special Issue "Virtual Special Issue: Advancing socio-hydrology: a synthesis of coupled human–water systems across disciplines" focusing on the theme "Big data/citizen science".

### *Journal of Soil and Sediments (Springer)*

- Paolo Porto: Associate Editor since 2019

Featured Articles di HSJ:

- Annis, A. F. Nardi, E. Volpi & A. Fiori, Quantifying the relative impact of hydrological and hydraulic modelling parameterizations on uncertainty of inundation maps, *Hydrological Sciences Journal*, DOI: 10.1080/02626667.2019.1709640, 2020
- Blöschl, G., Bierkens, M. F., Chambel, A., Cudenneq, C., Destouni, G., Fiori, A., ... & Stumpp, C. (2019). Twenty-three unsolved problems in hydrology (UPH)—a community perspective. *Hydrological Sciences Journal*, 64(10), 1141-1158.

## 2.4 Goals, priorities and plans for future Scientific Initiative

For the 2019 the plan is to continue to actively participate to IAHS initiatives through targeted activities. To date, various initiatives are being planned, among which:

- Conferences:
  - EGU General Assembly 4-8 Maggio, 2020
    - Subsurface flow and transport from pore to catchment scales: Concepts, observations, applications and modeling, Convener: Alraune Zech. Co-conveners: Natalie Orłowski, Felipe de Barros, Marco Dentz, Antonio Zarlenga, Peter Chiffard.
    - HS3.6: Spatio-temporal and/or (geo) statistical analysis of hydrological events, floods, extremes, and related hazards, Convener: Gerald A Corzo P | Co-conveners: A.B. Bardossy, Panayiotis Dimitriadis, Svenja Fischer, Ross Woods
    - HS7.10: Spatial extremes in the hydro- and atmosphere: understanding and modelling, Co-organized by NH1, co-sponsored by ICSH-STAHY (IAHS), Convener: Manuela Irene Brunner | Co-conveners: A.B. Bardossy, Philippe Naveau, Simon Michael Papalexiou, Elena Volpi
    - HS7.6: Precipitation small scale variability, hydrometeorologic extremes, and land-use feedbacks in the atmospheric water cycle, and beyond, Co-organized by AS4/CL2/NH1/NP3, Convener: Auguste Gires | Co-conveners: Jose Luis Salinas, Ruud van der Ent, Hannes Müller-Thomy, Lan Wang-Erlandsson, Remko Uijlenhoet, Katharina Lengfeld
    - 2020 STAHY Workshop September 24 – 25, Valencia, Spain (local organizer Felix Frances); come per la precedente edizione è previsto uno Short Course per gli Early Career Scientists e l'attribuzione del STAHY Best Paper Award 2020, la cui valutazione è in progress.
    - International stand-alone Symposium on: River sediment quality and quantity: environmental, geochemical and ecological perspectives - (<http://ICCE2020.ukw.edu.pl>). The conference, to be held at Bydgoszcz, Poland was initially scheduled in June 1-5, 2020, but due to covid-19 problems, it was postponed on October 26-30, 2020.
- Submission to *Hydrological Sciences Journal* of a Community paper on statistical hydrology.
- Sponsorship of the 2020 Summer School on Extremes in Water Science organized by WARREDOC, University for Foreign Students in Perugia, at Villa La Colombella (PERUGIA, ITALY), 12th – 17th July 2020
- 2020 MOXXI session at IDRA (XXXVII Convegno Nazionale di Idraulica e Costruzioni Idrauliche): “Tecniche di misura al suolo e da sensori remoti per il monitoraggio e modellazione dei processi idrologici”. Conveners: Giovanni Ravazzani, Silvia Barbetta, Flavia Tauro

## 2.5 Scientific Publications (*peer-reviewed papers*)

1. Alimenti F., Bonafoni S., Gallo E., Palazzi V., Vincenti Gatti R., Mezzanotte P., Roselli L., Zito D., Barbetta S., Corradini C., Termini D. and Moramarco T. (2020). Non-Contact Measurement of River Surface Velocity and Discharge Estimation with a Low-Cost Doppler Radar Sensor. *IEEE Transactions on Geoscience and Remote Sensing*. 10.1109/TGRS.2020.2974185

2. Bjerklie D. M., Fulton J. W., Dingman S. L., Canova M. G., Minear Justin T. & Moramarco T., (2020). Fundamental Hydraulics of Cross-sections in Natural Rivers: Preliminary Analysis of a Large Data Set of Acoustic Doppler Flow Measurements. *Water Resources Research*, <https://doi.org/10.1029/2019WR025986>
3. Blöschl G., M. F.P. Bierkens, A. Chambel, C. Cudennec, G. Destouni,.... P. Claps, et al., Twenty-three Unsolved Problems in Hydrology (UPH) – a community perspective, *Hydrological Sciences Journal*, DOI: 10.1080/02626667.2019.1620507, 2019
4. Blöschl, G. et al. (2019). Twenty-three unsolved problems in hydrology (UPH)–a community perspective. *Hydrological Sciences Journal*, 64(10), 1141-1158.
5. Blöschl, G.; J. Hall ; A. Viglione; R. Perdigão; J. Parajka; B. Merz; Lun, David; Arheimer, Berit; G. Aronica; A. Bilibashi; M. Boháč; O. Bonacci; ;M. Borga; I. Čanjevac, ; A. Castellarin; G.B. Chirico; P. Claps, et al., Changing climate both increases and decreases European river floods. *NATURE – ISSN 0028-0836. – 2019 .*
6. Coschignano, G., Nicolaci, A., Ferrari, E., Cruscomagno, F., Iovino, F. (2019). Evaluation of hydrological and erosive effects at the basin scale in relation to the severity of forest fires. *IForest- Biogeosciences and Forestry*, 12(5), 427-434.
7. Ferro V., Porto P. (2019). Closure to "Applying hypothesis of self-similarity for flow-resistance law in Calabrian gravel-bed rivers". *Journal of Hydraulic Engineering* 145(4), 07019002. DOI: 10.1061/(ASCE)HY.1943-7900.0001575.
8. Fulton J.W., Mason C., Eggleston J., Nicotra M., Chiu C.L., Henneberg M. , Best H., Cederberg J., Holnbeck S., Lotspeich R., Laveau C., Moramarco T., Jones M., Gourley J., Wasielewski D. (2020). Remote Sensing of Surface Velocity and River Discharge Using Radars and the Probability Concept at 10 USGS Streamgages. *Remote Sensing.. 2020, 12(8), 1296;*
9. Khodadadi, M., Mabit, L., Zaman, M., Porto, P., Gorji, M. (2019). Using 137Cs and 210Pbex measurements to explore the effectiveness of soil conservation measures in semi-arid lands: a case study in the Kouhin region of Iran. *Journal of Soils and Sediments* 19(4), pp. 2103-2113. DOI: 10.1007/s11368-018-2205-y.
10. A. Libertino, D. Ganora and P. Claps. Evidence for increasing rainfall extremes remains elusive at large spatial scales: the case of Italy. *Geophysical Research Letters*, 46, DOI:10.1029/2019GL083371, 2019
11. Manfreda S., Pizarro A., Moramarco T., Cimorelli L., Pianese D., Barbetta S. (2020) ‘Is it really advantageous the adoption of the flow-area rating curve?’, *Journal of Hydrology*, <https://doi.org/10.1016/j.jhydrol.2020.124752>.
12. Moramarco, T., Barbetta, S., Bjerklie, D.M., Fulton, J.W., Tarpanelli, A. (2019). River Bathymetry Estimate and Discharge Assessment from Remote Sensing. *Water Resources Research*, DOI: 10.1029/2018WR024220
13. Porto P., Callegari, G. (2019). A Probabilistic Approach to Interpret Long-Term Observations of Sediment Yield in Experimental Catchments in Southern Italy. In: ‘Climate Change Impacts on Hydrological Processes and Sediment Dynamics: Measurement, Modelling and Management’ eds. S. Chalov, V. Golosov, R. Li, A. Tsyplenkov. Springer Proceedings in Earth and Environmental Sciences, SPEES, 110–117.
14. Porto P., Callegari, G. (2019). Initial results of sediment yield measurement interpretation using a regional approach: Southern Italy case study. *Proc. IAHS*, 96, 1–6, 2019 <https://doi.org/10.5194/piahs-96-1-2019>.
15. Qamar M. U., M. Azmat, P. Claps, Pitfalls in transboundary Indus Water Treaty: a perspective to prevent unattended threats to the global security, *NATURE Clean Water*, DOI: 10.1038/s41545-019-0046-x, 2019
16. Sirangelo, B., Caloiero, T., Coscarelli, R., Ferrari, E. (2019). A Stochastic Approach for the Analysis of Long Dry Spells with Different Threshold Values in Southern Italy. *Water*, 11(10), 2026, doi:10.3390/w11102026.

### 3. Scientific activities carried on during 2019 and impact on the Italian scientific community

The activity can be identified, first, in the dissemination among Italian Universities and Research Institutions of the IAHS/IUGG programs. Moreover, it has been promoting a direct cooperation



between IAHS and the Hydrological Sciences Division of the European Geosciences Union (EGU) so that the Italian community may benefit of exchange of information and possible joint activities concerning educational opportunities, student programs, and professional services for members of both organizations. In addition, through the Italian Hydrological Society, initiatives are addressed to foster the synergy among the Italian scientific community, the national authorities and firms for activities linked to water resources management and natural hazards. Details of activities are summarized as in the sequel.

- Participation to the CNR-IUGG Commission.
- Dissemination of activities of IUGG among Italian Universities and Research Institutions for the meetings participation and IUGG Research Grant applications

#### **4. Evaluation of the participation in terms of benefits and membership cost**

The benefits of the participation in the Union are certainly positive for the Italian Scientific Community both for the resources made available by IUGG for the various initiatives promoted and which foster the attendance to Congresses and Research Grant applications and for the activities developed by the various groups operating in IAHS/IUGG and chaired by Italian researchers, as can be also inferred from the Section2 of the document.

#### **5. Evaluation of Italians' attendance and how to improve interest and involvement**

The participation of Italian scientists to initiatives organized under the IAHS umbrella is already significant as proved from different Courses, Conference and Meetings organized by the Groups/Commissions led by Italian scientists. However, the interest towards the IAHS activities can be improved if more financial resources are made available from IUGG, and it would be great from CNR as well, for international activities in the field of hydrological sciences, involving Italian scientist and in particular the youngest ones.

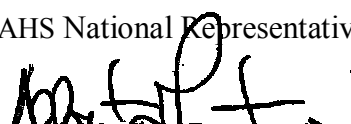
#### **6. Italian experts with important roles within the Union or within related Commissions and Programs**

- *Dr. Tommaso Moramarco*. Alternate National Representative IAHS/IUGG and President of Italian Hydrological Society.
- *Prof. Alberto Montanari*. National Representative IAHS/IUGG, member of the CNR/IUGG Commission. Alberto Montanari is also president of EGU for the term 2019 – 2021 and was bestowed the Dooge Medal by IAHS in 2019.
- *Prof. Attilio Castellarin*. Editor in Chief of *IAHS Hydrological Sciences Journal*
- *Prof. Aldo Fiori*. President International Commission for Ground Water (ICGW)
- *Prof. Salvatore Grimaldi*. International Commission on Statistical Hydrology of (ICSH/IAHS)
- *Dr. Fernando Nardi*. President Citizen AND Hydrology Working Group (CandHy WG)
- *Dr. Paolo Porto*. President-elect of the International Commission on Continental Erosion/International Association of Hydrological Sciences (ICCE/IAHS).
- *Dr. Flavia Tauro*. Chair MOXXI Working Group (Measurements & Observations in XXI Century);
- *Prof. Elena Toth*, Vice Presidente of the Italian Hydrological Society.
- *Dr. Elena Volpi*. President-elect of the International Commission on Statistical Hydrology of (ICSH/IAHS).

#### **Acknowledgments**

I would like to thank the Italian experts above listed for their enthusiastic and constant activities under the IAHS umbrella. Moreover their contribution to this report is highly acknowledged.

IAHS National Representative



Prof. Alberto Montanari

Bologna, May 24, 2020