

International Association of Hydrological Sciences -IAHS

Activities' Report - Year 2018

Tommaso Moramarco

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 2018 can be identified by the activities of:

- a) *International Commission on Water Resource (ICWR/IAHS)*, <https://iahs.info/Commissions--W-Groups/ICWR-Resources-Systems.do>, of which Alberto Montanari (Alternate national Representative IAHS) is past president. ICWR/IAHS is aimed to promote research development on the integration of all phases of water resource protection, planning, design, management, operation and utilization;
- b) *International Commission for Ground Water (ICGW)*, <https://iahs.info/Commissions--W-Groups/ICGW-Groundwater.do>, presided 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; the Secretary in charge is Dr. Elena Volpi (Università degli Studi Roma Tre). 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>, whose aim is to promote the research in the erosion, transport and deposition of sediment and associated nutrients and contaminants and the interaction of these processes with other components of the hydrological cycle and the environment. The Secretary in charge is Dr. Paolo Porto (Università Mediterranea of Reggio Calabria)
- f) *International Commission on Surface Hydrology (ICSW)*, <https://iahs.info/Commissions--W-Groups/ICSW-Surface-Water.do>, whose vice-president is Prof. Ennio Ferrari (University of Calabria). 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, 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 (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, 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 2018 relevant for Italy and for CNR

The most relevant activity developed in the period 2018 is related to the activities of Groups involved in IAHS and in particular: 1) *International Commission on Statistical Hydrology (ICSH-STAHY)*; 2) *MOXXI Working Group* (Measurements & Observations in XXI Century); 3) *International Commission on Continental Erosion/International Association of Hydrological Sciences (ICCE/IAHS)*; 4) *Italian Hydrological Society (SII)*; 5) *International Commission on Water Resource (ICWR/IAHS)*; 6) *Citizen AND HYdrology Working Group (CandHy WG)*; 7) *International Commission on Surface Hydrology (ICSW)* and 8) *International Commission for Ground Water (ICGW)*. Specifically, the main activities can be identified as in the sequel.

2.1 Organization of conferences, workshops 2018

- EGU-General Assembly 2018, Vienna 9-14 April, 2018, Session HS7.7/NH1.17 - Hydroclimatic and hydrometeorologic stochastics: extremes, scales and probabilities PICO session. Convener: Alberto Viglione; Co-conveners: Rui A.P. Perdigão, Marco Borga, Andrea Langousis, Xiaolan L. Wang, Salvatore Grimaldi, Auguste Gires Website: <https://meetingorganizer.copernicus.org/EGU2018/session/26630>
- STAHY'18 WORKSHOP, Adelaide, South Australia, September 24-26, 2018; local organizer Dmitri Kavetski. Apart from stimulating discussions on the multiple facets of statistical hydrology, the STAHY'18 workshop also commemorated the lifetime of contributions by Professor George Kuczera to the discipline. Professor Kuczera presented a thoughtful assessment of the importance of type I and II errors in hydrological practice, and how we may be making larger longer-term mistakes at the cost of reducing short-term errors by focusing more on one error type than another. <https://www.stahy2018.org/>
- 2018 European Geosciences Union (EGU) General Assembly, poster session “The MacGyver session”, Vienna, Austria, co-organized by the working group MOXXI, co-convener: Flavia Tauro.
- Session: Tecniche di misura al suolo e sensori remoti per il monitoraggio e modellazione dei processi idrologici, co-organized by the working group MOXXI. Conveners: Flavia Tauro, Silvia Barbetta. XXXVI Convegno Nazionale di Idraulica e Costruzioni Idrauliche, Ancona, September 12-14. Italy.
- 2018 American Geophysical Union Fall Meeting, Session: The MacGyver Session: The place for novel, exciting, self-made, hacked, or improved sensors, data acquisition, and data transmission solutions to understand the geosphere, Washington DC, USA, co-convener: Salvatore Grimaldi.
- Hydrology Days of Italian Hydrological Society 2018, Università La Sapienza, Roma, June 18-20, (www.sii-ihs.it). The Conference has permitted to sharing the experience of Italian hydrology community with Public Authorities and Stakeholders in the field of natural hazards and water resources management
- EGU 2018. Session: HS8.1.4 Subsurface flow and solute transport: Concepts, modelling, observations and applications of dispersion, mixing and reactive transport in heterogeneous media. Convener: Alraune Zech; Co-Conveners: Marco Dentz, Sabine Attinger, Aldo Fiori, Felipe de Barros, Antonio Zarlenga (<http://meetingorganizer.copernicus.org/EGU2018/session/26637>)

- EGU 2018. Session: HS5.2 Water resources - assessment, management, and allocation - in (semi-)arid regions. Convener: Jan Friesen; Co-Conveners: Ralf Ludwig, Leonor Rodriguez-Sinobas, Laura Foglia (<https://meetingorganizer.copernicus.org/EGU2018/session/26608>)
- 2018 ICCE Symposium on "Climate Change Impacts on Sediment Dynamics: Measurement, Modelling and Management"; co-organizer Paolo Porto. Symposium was held in Moscow with "The Second International Young Scientists Forum on Soil and Water Conservation" (website: <http://www.eng.geogr.msu.ru/IYFSWC/home.php>).
- Workshop "2D Hydraulic Modelling - Debris Flow, Sediment Transport And Dam Break", organized by the WARREDOC, University of Foreigners with FLO-2D USA, Perugia July 16, 2018
- 2018 Digital Mapping short course on "Open Data, Big Data and Citizen Science", organized by the WARREDOC, University of Foreigners, Perugia, Italy, November 22nd, 2018, Co-organized by CANDHY and MOXXI and sponsored by the Italian Group of Hydraulics and the Italian Hydrological Society
- International Workshop "Open/Big Data & Citizen Science for Managing the Water, Food, Energy and Environment Nexus", November 22nd, 2018, Perugia, Italy organized by WARREDOC, University of Foreigners, Perugia, Italy, November 22nd, 2018, with ISPRA and CREA National Research Institutions and Co-organized by IAHS CANDHY and MOXXI Working Groups and sponsored by the Italian Group of Hydraulics and the Italian Hydrological Society
- 2019 International Doctoral Winter School on the theme "DATA RICH HYDROLOGY" organized by WARREDOC, University of Foreigners, Consorzio interuniversitario per l'idrologia CINID, UNESCO World Water Assessment Program WWAP and sponsored by the Italian Group of Hydraulics and the Italian Hydrological Society and held at Villa La Colombella, UNESCO and WARREDOC Headquarter, January 28th, February 1st, 2019
- Brainstorming-Workshop on State-of-the-Art Hydrometric Data Acquisition and Transmission Networks: Measurements and Modelling, organized by Indian Institute of Technology and the Indian Ministry of Water Resources with the collaboration of IAHS national rep, Tommaso Moramarco, New Delhi, February 2018

2.2 Organization of scientific initiatives 2018

- *The MOXXI working group* is keeping increasing its visibility (currently reached 134 members); 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. Members of the COST Action and MOXXI Friends have met in Valencia (COST Action first meeting in February 2018), Vienna (EGU), Belgrade (experimental campaign from November 8th to 10th 2018) and Rome (meeting of the working group on River morphology and Stream flow, March 2018).
- The community paper: "Measurements and Observations in the XXI century (MOXXI): innovation and multidisciplinary to sense the hydrological cycle" has achieved 36 citations (on google scholar) and 2550 views in a bit more than one year since its publication.
- 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) are invited to: i) present the initiative to their members and begin discussing by email exchanges, contributing to the IAHS LinkedIn forum, and ii) add this point in the agenda of each SD meeting in Vienna, focusing on the problems close to expertise of each SD, making sure that important problems/questions were not left out of the list. The paper "Twenty Three Unsolved Problems in Hydrology – a Community Perspective" by Blöschl et al., 2019 is in press on Hydrological Science Journal (<https://www.tandfonline.com/doi/full/10.1080/02626667.2019.1620507>).
- Florisa Melone Award 2018 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. Giulia Zuecco was bestowed for the project "*Scambi Idrici tra suoLo, Vegetazione e Atmosfera: un'analisi comparativa in due bacini forestati italiani*".

- 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.
- 27th IUGG General Assembly JH04/JH05a - 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 Mendiondo, Andy Wickert.
- 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).
- CANDHY WG was presented at the CITIZEN OBSERVATORIES FOR NATURAL HAZARDS AND WATER MANAGEMENT (COWM) 2018 Conference held in Venice, November 27-30, 2018 with an invited talk by Dr. Nardi titled “IAHS Working Group on on “Citizen and Hydrology” (CANDHY)”
- CANDHY WG was presented at the SMIREC COST Action within the Workshop “An EU-wide citizen science network to monitor hydrological conditions in intermittent rivers and ephemeral streams” organized on November 27- 28 at JRC Headquarter, Ispra, Italy
- CANDHY WG was presented at the 2018, AGU Fall Meeting on December 11th, 2018 (Washington DC) in the session “PA23C Leveraging Social Media, Crowdsourcing, Citizen Science, and Emerging Technologies for Robust Scientific Understanding and Hazard Response II eLightning” with a contribution titled “Citizen science for understanding, monitoring and communicating hydrological processes: the IAHS Citizen AND Hydrology (CANDHY) Working Group” by Dr. Nardi.
- Memorandum of Understanding between the Hydrological Sciences Division of the EGU and the IAHS aimed at a closer relationship between the two organisations. The Memorandum was signed by Elena Toth President of the EGU Hydrological Sciences division (EGU HS) and Gunter Bloeschl, president IAHS.

2.3 Editorial Board Participation

IAHS Hydrological Sciences Journal

- Attilio Castellarin: Editor in Chief dal 2017 (Co-Editor dal 2015), Università di Bologna
- Marco Borga, Guest Editor, Università di Padova
- Alessio Domeneghetti, Associate Editor, Università di Bologna
- Aldo Fiori, Associate Editor, Università Roma Tre
- Andrea Petroselli: Associate Editor, University of Tuscia
- Flavia Tauro: Associate Editor, University of Tuscia
- Elena Volpi: Associate Editor, Università Roma Tre

Featured Articles di HSJ:

- Measurements and Observations in the XXI century (MOXXI): innovation and multidisciplinary to sense the hydrological cycle. Flavia Tauro, John Selker, Nick van de Giesen, et al., 63(2)
https://www.tandfonline.com/10.1080/02626667.2017.1420191?utm_source=CPB&utm_medium=cms&utm_campaign=JOD09312
- Detection of trends in magnitude and frequency of flood peaks across Europe by Walter Mangini, Alberto Viglione, Julia Hall, et al., 63 (4)
https://www.tandfonline.com/10.1080/02626667.2018.1444766?utm_source=CPB&utm_medium=cms&utm_campaign=JOD09312

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:

- Special Issue on Hydrological Sciences Journal IAHS: “Virtual Special Issue: Advancing socio-hydrology: a synthesis of coupled human–water systems across disciplines” by Stacey Archfield (HSJ Co-editor) e Saket Pande (Guest Editor Responsabile). Fernando Nardi, IAHS CANDHY WG Chair, Guest Editor on the sub-topic “Big data/citizen science“ <https://think.taylorandfrancis.com/advancing-socio-hydrology-special-issue-from-hsj/>
- The Future of Hydrology - International Workshop in honor of Guenter Bloeschl – Bologna, maggio 2020. During the meeting dates the University of Bologna will confer to Guenter Bloeschl a degree honoris causa in environmental engineering.
- Special Issue on Journal of Soil and Sediments (Springer): The interactions between sediments and water (<https://link.springer.com/article/10.1007/s11368-018-2128-7>). Editor(s): Paolo Porto & Vito Ferro
- 2019-2020 Doctoral Winter and/or Summer Schools on Hydrology organized by WARREDOC, University of Foreigners, UNESCO World Water Assessment Program WWAP and sponsored by the Italian Group of Hydraulics and the Italian Hydrological Society and held at Villa La Colombella, UNESCO and WARREDOC Headquarter (Date to be decided, 2019)
- EGU General Assembly 2019. Gdb4 - Rewards and recognition in science: what value should we place on contributions that cannot be easily measured, Co-sponsored by AGU and JpGU. Convener: Alberto Montanari | Co-conveners: Jonathan Bamber, Robin Bell, Hiroshi Kitazato, Lily Pereg
- EGU General Assembly 2019. SCS1 - Science, Politics and European (dis)integration: A conversation of Geoscientists with Ilaria Capua and Mario Monti, Co-organized as EOS/ESSI/G6.6/GD/HS1.2.12. Conveners: Alberto Montanari, Jonathan Bamber
- EGU General Assembly 2019. US4 - Promoting and supporting equality of opportunities in geosciences, Co-sponsored by AGU and JpGU. Convener: Claudia Alves de Jesus Rydin | Co-conveners: Alberto Montanari, Robin Bell, Chiaki Oguchi, Lily Pereg
- EGU General Assembly 2019. HS7.4 - Hydroclimatic change and unchange: exploring the mysteries of variability, nature and human impact, Co-organized as CL2.29/NP3.7, co-sponsored by IAHS and WMO CHy. Convener: Serena Ceola | Co-conveners: C. Cudennec, Demetris Koutsoyiannis, Harry Lins, Alberto Montanari
- EGU General Assembly 2019. GDB1 - The safe operating space for the planet and how to ensure it is not passed. Convener: Jonathan Bamber | Co-conveners: Alberto Montanari, Didier Roche.
- Organization of Joint Symposium Session at 2019 IUGG titled JH04/JH05a - 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)
- Community paper by ICSH-STAHY on the first 10 years of activity.
- Special issue on Remote Sensing: Unmanned Aerial Systems for Surface Hydrology, Guest Editor: Flavia Tauro.
- Co-organization by ICSH-STAHY of the EGU General Assembly 2019 (Vienna, Austria | April 7–12, 2019) HS7.7/NH1.18 session: Hydrometeorologic variability: spatio-temporal scales and probability of extremes (co-organized) PICO session (<http://meetingorganizer.copernicus.org/EGU2019/session/26630>)
- Co-organization by ICHS-STAHY of the following IUGG General Assembly 2019 sessions (Montreal, Canada| July 8-18, 2019, <http://iugg2019montreal.com>):
 - 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)

- 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)
 - 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)
 - H27– Multivariate statistics for hydrological application. Convener: Salvatore Grimaldi (Italy). Co-Conveners: Taha Ouara (Canada), Andras Bardossy (Germany), Amir AghaKouchak (USA).
 - 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)
 - Session: Innovative ICT tools for water management and science. Convener: Laura Foglia. Co-Conveners: Berit Arheimer, Andrea Brookfield, Mary Hill, Rudy Rossetto, Melody Sandells.
- ICSH-STAHY Workshop 2019 (Nanjing, China | ottobre 19-20, 2019 <http://www.stahy2019.org/>), organized by Hohai University (Prof. Yuanfang Chen). The workshop will be preceded (October 18, 2019) by the Early Career Course for the early career members (<https://younghs.com/>). The program includes the following talk: “How to communicate statistics to the hydrological community/practice partners” by Salvatore Grimaldi
 - Conference in the ICCE framework (<http://ICCE2020.ukw.edu.pl>):
 - International Symposium on: River sediment quality and quantity: environmental, geochemical and ecological perspectives - that will be held at Bydgoszcz, Poland in June 1-5, 2020

2.5 Scientific Publications (*peer-reviewed papers*)

- 1) Tauro F., Tosi F., Mattoccia S., Toth E., Piscopia R., Grimaldi S. :“Optical Tracking Velocimetry (OTV): leveraging optical flow and trajectory-based filtering for surface streamflow observations”, *Remote Sensing*, 10(12), 2018.
- 2) Manfreda S., McCabe M., Miller P., Lucas R., Madrigal V. P., Mallinis G., Ben Dor E., Helman D., Estes L., Ciruolo G., M‘ullerov´a J., Tauro F., De Lima M. I., De Lima J. L. M. P., Frances F., Caylor K., Kohv M., Maltese A., Perks M., Ruiz-P´erez G., Su Z., Vico G., Toth B.:“On the use of unmanned aerial systems for environmental monitoring”, *Remote Sensing*, 10(4), 641, 2018.
- 3) Toth E., Bragalli C., Neri M., Assessing the significance of tourism and climate on residential water demand: Panel-data analysis and non-linear modelling of monthly water consumptions, *Environmental Modelling & Software*, 103, 52-61, DOI:10.1016/j.envsoft.2018.01.011, 2018.
- 4) MOXXI (sarà già nella lista di Flavia/Salvatore). Tauro, F.; Tosi, F.; Mattoccia, S.; Toth, E.; Piscopia, R.; Grimaldi, S. Optical Tracking Velocimetry (OTV): Leveraging Optical Flow and Trajectory-Based Filtering for Surface Streamflow Observations, *Remote Sens.*, 10 (12), 2010, 2018.
- 5) Convertino M., Annis A., Nardi F., Information-theoretic portfolio decision model for optimal flood management, *Environmental Modelling & Software*, 2019 (in press)

- 6) Annis, A., Nardi, F., Morrison, R.R., Castelli, F. Investigating hydrogeomorphic floodplain mapping performance with varying DTM resolution and stream order, (2019) *Hydrological Sciences Journal*, 64 (5), pp. 525-538.
- 7) Scheel, K., Morrison, R.R., Annis, A., Nardi, F. Understanding the Large-Scale Influence of Levees on Floodplain Connectivity Using a Hydrogeomorphic Approach (2019) *Journal of the American Water Resources Association*, 55 (2), pp. 413-429
- 8) Annis, A., Nardi, F. Integrating VGI and 2D hydraulic models into a data assimilation framework for real time flood forecasting and mapping (2019) *Geo-Spatial Information Science*, 1-14.
- 9) Nardi, F., Annis, A., Baldassarre, G.D., Vivoni, E.R., Grimaldi, S. GFPLAIN250m, a global high-resolution dataset of earth's floodplains (2019) *Scientific Data*, 6, art. no. 309
- 10) Peña, F., Nardi, F. Floodplain terrain analysis for coarse resolution 2D flood modeling (2018) *Hydrology*, 5 (4), art. no. 52
- 11) Nardi, F., Morrison, R.R., Annis, A., Grantham, T.E. Hydrologic scaling for hydrogeomorphic floodplain mapping: Insights into human-induced floodplain disconnectivity (2018) *River Research and Applications*, 34 (7), pp. 675-685
- 12) Morrison, R.R., Bray, E., Nardi, F., Annis, A., Dong, Q. Spatial Relationships of Levees and Wetland Systems within Floodplains of the Wabash Basin, USA, (2018) *Journal of the American Water Resources Association*, 54 (4), pp. 934-948
- 13) De Paola, F., Giugni, M., Pugliese, F., Annis, A., Nardi, F., GEV parameter estimation and stationary vs. non-stationary analysis of extreme rainfall in African test cities (2018) *Hydrology*, 5 (2), art. no. 28
- 14) Nardi, F., Annis, A., Biscarini, C. On the impact of urbanization on flood hydrology of small ungauged basins: the case study of the Tiber river tributary network within the city of Rome (2018) *Journal of Flood Risk Management*, 11, pp. S594-S603
- 15) Manfreda, S., Samela, C., Refice, A., Tramutoli, V., Nardi, F. Advances in large-scale flood monitoring and detection, (2018) *Hydrology*, 5 (3), art. no. 49
- 16) Paranunzio, Roberta; Ceola, Serena; Laio, Francesco; Montanari, Alberto, Evaluating the Effects of Urbanization Evolution on Air Temperature Trends Using Nightlight Satellite Data, *ATMOSPHERE*, 3, 2019
- 17) Iliopoulou, Theano; Aguilar, Cristina; Arheimer, Berit; Bermudez, Maria; Bezak, Nejc; Ficchi, Andrea; Koutsoyiannis, Demetris; Parajka, Juraj; Jose Polo, Maria; Thirel, Guillaume; Montanari, Alberto, A large sample analysis of European rivers on seasonal river flow correlation and its physical drivers, *HYDROLOGY AND EARTH SYSTEM SCIENCES*, 1, 73-91, 2019
- 18) Pugliese, Alessio; Persiano, Simone; Bagli, Stefano; Mazzoli, Paolo; Parajka, Juraj; Arheimer, Berit; Capell, Rene; Montanari, Alberto; Bloeschl, Guenter; Castellarin, Attilio, A geostatistical data-assimilation technique for enhancing macro-scale rainfall-runoff simulations, *HYDROLOGY AND EARTH SYSTEM SCIENCES*, 9, 4633-4648, 2018
- 19) Iliopoulou, Theano; Koutsoyiannis, Demetris; Montanari, Alberto, Characterizing and Modeling Seasonality in Extreme Rainfall, *WATER RESOURCES RESEARCH*, 9, 6242-6258, 2018
- 20) Fang, Yu; Ceola, Serena; Paik, Kyungrock; McGrath, Gavan; Rao, P. Suresh C.; Montanari, Alberto; Jawitz, James W., Globally Universal Fractal Pattern of Human Settlements in River Networks, *EARTHS FUTURE*, 8, 1134-1145, 2018
- 21) Ceola, Serena; Pugliese, Alessio; Ventura, Matteo; Galeati, Giorgio; Montanari, Alberto; Castellarin, Attilio, Hydro-power production and fish habitat suitability: Assessing impact and effectiveness of ecological flows at regional scale, *ADVANCES IN WATER RESOURCES*, , 29-39, 2018
- 22) Sirangelo, B., Caloiero, T., Coscarelli, R., Ferrari, E. (2018). A combined stochastic analysis of mean daily temperature and diurnal temperature range. Theoretical and applied climatology. ISSN: 0177-798X. doi: 10.1007/s00704-018-2441-5
- 23) Caloiero T., Sirangelo B., Coscarelli R., Ferrari E. (2018). Occurrence probabilities of wet and dry periods in southern Italy through the SPI evaluated on synthetic monthly precipitation series. *WATER*, vol. 10, 336, ISSN: 2073-4441. doi: 10.3390/w10030336

- 24) Ferrari E., Coscarelli R., Sirangelo B. (2018). Correlation analysis of seasonal temperature and precipitation in a region of southern Italy, *Geosciences*, 8, 160.
doi:10.3390/geosciences805016
- 25) Coscarelli R., Caloiero T., Ferrari E., Sirangelo B. (2018). Detection and analysis of drought events in Calabria (Southern Italy). *Italian Journal of Engineering Geology and Environment*, Special Issue 1, Sapienza Università Editrice. doi: 10.4408/IJEGE.2018-01.S-02
- 26) Caloiero T., Coscarelli R., Ferrari E. (2018). Application of the innovative trend analysis method for the trend analysis of rainfall anomalies in Southern Italy. *Water Resources Management*. doi.org/10.1007/s11269-018-2117-z
- 27) Caloiero T., Coscarelli R., Ferrari E. (2018). Analysis of monthly rainfall trend in Calabria (Southern Italy) through the application of statistical and graphical techniques. *Proceedings*, 2, 629. doi:10.3390/proceedings2110629
- 28) Ferro V., Porto P. (2018). Applying hypothesis of self-similarity for flow-resistance law in Calabrian gravel-bed rivers. *Journal of Hydraulic Engineering* 144(2), DOI: 10.1061/(ASCE)HY.1943-7900.0001385.
- 29) Ferro V., Porto P. (2018). Assessing theoretical flow velocity profile and resistance in gravel bed rivers by field measurements. *Journal of Agricultural Engineering VOL. XLIX*: 810, 220-227. DOI: 10.4081/jae.2018.810.
- 30) Meusburger K., Porto P., Mabit L., La Spada C., Arata L., Alewell C. (2018). Excess Lead-210 and Plutonium-239+240: Two suitable radiogenic soil erosion tracers for mountain grassland sites. *Environmental Research* 160, 195-202.
- 31) Porto P., Cogliandro V., Callegari, G. (2018). Exploring the performance of the SEDD model to predict sediment yield in eucalyptus plantations. Long-term results from an experimental catchment in Southern Italy. *IOP Conference Series: Earth and Environmental Science* 107(1), 012020.
- 32) Bagarello V., Ferro V., Pampalone V. Porto P., Todisco F., Vergni L. (2018). Predicting soil loss in Central and South Italy with a single USLE-MM model. *Journal of Soils and Sediments* 18(12), 3365-3377. DOI: 10.1007/s11368-018-1953-z.
- 33) Altieri V., De Franco S., Lombardi F., Marziliano P.A., Menguzzato G., Porto P. (2018). The role of silvicultural systems and forest types in preventing soil erosion processes in mountain forests: a methodological approach using cesium-137 measurements. *Journal of Soils and Sediments* 18(12), 3378-3387. DOI: 10.1007/s11368-018-1957-8.
- 34) Ferro V., Porto P. (2018). Preface: Proceedings of the 14th IASWS international conference. *Journal of Soils and Sediments* 18(12), 3361-3363. DOI: 10.1007/s11368-018-2128-7.
- 35) Porto P., Walling D.E., Callegari, G. (2018). Using repeated ¹³⁷Cs and ²¹⁰Pbex measurements to establish sediment budgets for different time windows and explore the effect of connectivity on soil erosion rates in a small experimental catchment in Southern Italy. *Land Degrad. Dev.* 29, 1819–1832. DOI: 10.1002/ldr.2815.
- 36) Barbetta, S., Coccia, G., Moramarco, T., Todini, E. (2018) Real-time flood forecasting downstream river confluences using a Bayesian approach. *Journal of Hydrology*, 565, pp. 516-523.
- 37) Tayfur, G., Singh, V.P., Moramarco, T., Barbetta, S. (2018). Flood hydrograph prediction using machine learning methods. *Water (Switzerland)*, 10 (8)
- 38) Termini, D., Moramarco, T. (2018) Dip phenomenon in high-curved turbulent flows and application of entropy theory *Water (Switzerland)*, 10 (3)

3. Activities carried on by Dr. Tommaso Moramarco within the Union during 2017 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 as a Member.
- Dissemination of activities of IUGG among Italian Universities and Research Institutions for the meetings participation and IUGG Research Grant applications
- Promote the nomination of Professor Alberto Montanari for the 2019 Dooge Medal (International Hydrology Prize) of IAHS/UNESCO/WMO. The initiative had a positive outcome and Prof. Montanari will be awarded the Dooge medal for his outstanding contributions to an improved understanding of flood events, climate impact on water resources and his leadership in the international community of hydrologists. The award ceremony will be held on July 2019, during the 27th IUGG General Assembly in Montreal.
- Coordinate the procedure for the 2018 Florisa Melone Award given by the Italian Hydrological Society
- Support Dr. Flavia Tauro for the 2019 IUGG Early Career Scientist Award. The initiative had a positive outcome and Dr. Tauro will be awarded during the 27th IUGG General Assembly in Montreal.

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 Section 2 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.

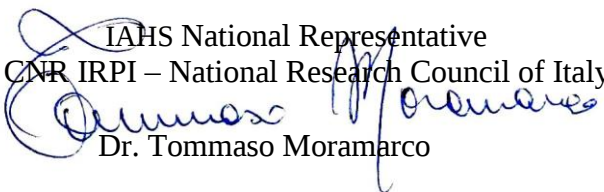
6. Italian experts with important roles within the Union or within related Commissions and Programs

- *Dr. Tommaso Moramarco*. National Representative IAHS/IUGG; Member of CNR-IUGG Commission and President of Italian Hydrological Society.
- *Prof. Alberto Montanari*. Alternate National Representative IAHS/IUGG and President of International Commission on Water Resource (ICWR/IAHS). Alberto Montanari was bestowed with the: a) *2017 Union Service Award* in recognition of his outstanding services to EGU's awards programme, incorporating the highest ethical standards and transparency in procedures; b) *2018 Henry Darcy Medal* for his physically based stochastic modelling and the major impact this had on water-resources engineering and management. Finally Alberto Montanari was elected President EGU for the period 2019-2021
- *Prof. Attilio Castellarin*. Editor in Chief of *IAHS Hydrological Sciences Journal*
- *Prof. Ennio Ferrari*. Vice-President International Commission on Surface Water (ICSW/IAHS)
- *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*. Secretary in charge 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*. President Division on Hydrological Sciences (HS) – EGU; Vice Presidente della Società Idrologica Italiana.
- *Dr. Elena Volpi*. Secretary in charge 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
CNR IRPI – National Research Council of Italy

Dr. Tommaso Moramarco

Perugia, July 1 2019