

International Association of Hydrological Sciences -IAHS

Activities' Report - Year 2016

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 2016 can be identified by:

- a) the contribution of Italian scientists in drawing up the IAHS statement, released in June 2015, entitled "*Prague Statement on A Need for Action to Develop Water Resources Management Systems*". The statement calls on the government, scientific community, and research funding agencies to develop a more efficient water management system capable of addressing the challenges presented by the global water crisis. The statement was published in the *Hydrological Sciences Journal* (Ceola, S., et al. "Adaptation of water resources systems to changing society and environment: a statement by the International Association of Hydrological Sciences." *Hydrological Sciences Journal* 61.16 (2016): 2803-2817.
- b) the activities of the International Commission on Water Resource (ICWR/IAHS), presided by Prof. Alberto Montanari (deputy IAHS Italian representative), aimed to promote research development on the integration of all phases of water resource protection, planning, design, management, operation and utilization;
- c) the activities related to the International Commission on Statistical Hydrology (ICSH/IAHS), which is presided by Prof. Salvatore Grimaldi (University of Tuscia). The activities of the commission are focused on the development of new statistical methods and tools for hydrological applications and described in detail at the web site www.stahy.org;
- d) the activities related to the MOXXI Working Group (Measurements & Observations in XXI Century), 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) the activities of International Commission on Continental Erosion/International Association of Hydrological Sciences (ICCE/IAHS) whose secretary is the Dr. Paolo Porto (University Mediterranea of Reggio Calabria) 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.
- f) the activities of the Italian Hydrological Society, belonging to the international network of IAHS's scientific associations, presided by Dr. Tommaso Moramarco (national IAHS correspondent), addressed to advance interest and scholarship in scientific and applied aspects of hydrology and encourage member 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 2016 relevant for Italy and for CNR

The most relevant activity developed in the period 2016 is related to the activities of Groups involved in IAHS and in particular: 1) the International Commission on Statistical Hydrology (ICSH) of IAHS; 2) the MOXXI Working Group (Measurements & Observations in XXI Century); 3) the International Commission on Continental Erosion/International Association of Hydrological Sciences (ICCE/IAHS); 4) the Italian Hydrological Society; 5) the International Commission on Water Resource (ICWR/IAHS). Specifically, the main activities can be identified as in the sequel.

2.1 Organization of conferences, workshops 2016

- Bochum IAHS - 18-20 May 2016 – 7th International Water Resources Management Conference of ICWRS. The conference included several Italian researchers in the Organizing Committee and gathered over 100 participants from all over the world.
- STAHY'16 WORKSHOP, September 26-27, 2016, INRS - Institut National de la Recherche Scientifique Quebec City, Canada, Chairman: Fateh Chebana, INRS, website: <http://stahy2016.ca>
- EGU-General Assembly 2016, Vienna April 17-22, 2016, Session HS7.9/AS1.30/CL2.21/NH1.12/NP3.8; Precipitation variability: spatio-temporal scales and hydrometeorologic extremes, Convener: Auguste Gires | Co-Conveners: Alberto Viglione , Alexis Berne , Marco Borga , Alin Andrei Carsteanu , Salvatore Grimaldi , Demetris Koutsoyiannis , Andreas Langousis , Hidde Leijnse , Katharina Lengfeld , Sabine Lennartz-Sassinek , Remko Uijlenhoet , Venugopal Vuruputur , Xiaolan Wang.
- EGU 15th Plinius Conference on Mediterranean Risks; Session Hydrological Risks: Socio-economic Impact, Human Response and Adaptation to storms, landslides and flood; Convener: Giuliano di Baldassarre and Tommaso Moramarco , Taormina, 8-11 June 2016
- Statistical French Society Conference, May 30- June 3, 2016, Montpellier, France. Session: Applications in hydro-meteorology and hydro-climatology. Conveners: Julie Carreau, Rim Chérif, Emna Gargouri and Luc Neppel .This session is sponsored by the Committee on Probability and Statistics in the Physical Sciences of the Bernoulli Society for Mathematical Statistics and Probability and by ICSH- IAHS. website: <http://jds2016.sfds.asso.fr>
- MOXXI First Topical Conference 2016, Frascati, European Space Agency, 21 November, 2016
- MOXXI session at EGU 2017 (Self-made sensors and unintended use of measurement equipment, co-organized by MOXXI executive team)
- Giornate dell'Idrologia della Società Idrologica Italiana 2016, Hydrology Days Conference, Trento 27-29 June. Organized by the *Società Idrologica Italiana* (www.sii-ihp.it) of the international network of IAHS's scientific associations
- ICCE Symposium 2016 - Integrating monitoring and modelling for understanding, predicting and managing sediment dynamics. Rothamsted Research, North Wyke, Okehampton, Devon, United Kingdom, Monday 11th July – Friday 15th July 2016 (selected papers have been published on the PIAHS Volume)

2.2 Organization of scientific initiatives 2016

- a) MOXXI working group visibility has considerably increased by involving experts through person-to-person invitations (currently, MOXXI includes 87 “friends” from more than 15 countries). MOXXI friends receive a newsletter every other month and can showcase their relevant papers in a dedicated page.
- b) Applied Course on UAVs for Environmental Monitoring, Matera, July 2016 (co-organized with University of Basilicata)
- c) STAHY Best Paper Award 2016 by *ICSH Commission*. The STAHY Best Paper is the result of evaluation of 20 papers, selected among the 274 papers (published in 2012-2013-2014) present in ICSH website and ordered by citations (SCOPUS database, excluding self citations). The STAHY Best Paper Award 2016 was assigned to: *Salas, J.D., Obeyseker, J.*

Revisiting the concepts of return period and risk for nonstationary hydrologic extreme events (2014) Journal of Hydrologic Engineering, 19 (3), pp. 554-568.

- d) Short Course "Copulas for hydrology and environmental sciences", organized by *ICSH Commission*, website: <http://www.stahy.org/Events/2016CopulaShortCourse/tabid/120/>, July 24-30, 2016, Centro Studi Alpino - Pieve Tesino, Italy

2.3 Editorial Board Participation

- 1) IAHS *Hydrological Sciences Journal*
 - Attilio Castellarin: Co-Editor, University of Bologna, Italy
 - Elena Toth: Associate Editor, University of Bologna, Italy
 - Elena Volpi: Associate Editor, Università Roma Tre, Italy
 - Flavia Tauro: Associate Editor, University of Tuscia, Italy
- 2) Special Issue on 'Sediment source fingerprinting for informing catchment management: methodological approaches, problems and uncertainty' Editor(s): Adrian Collins, Paolo Porto, Ian Foster and Allen Gellis, *Journal of Environmental Management* Volume 194, Pages 1-108, 2016.
- 3) Special Issue on "Advances in Hydro-Meteorological Monitoring". Editor: Tommaso Moramarco and Roberto Ranzi; *Water – Open Access Journal*. 2016

2.4 Goals, priorities and plans for future Scientific Initiative

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

- 1) MOXXI's Topical Conference 2017. To be organized in the Fall. The location is yet to be determined.
- 2) Community paper on MOXXI's objectives and major interests MOXXI's Topical Conference 2017.
- 3) Short Course COPULA '17 "Copulas for hydrology and environmental sciences" Nanjing, China, August, 2017-<http://www.stahy.org/Events/ShortcourseCOPULA17/tabid/130/>
- 4) STAHY'17 WORKSHOP, September 21-22, 2017, University of Life Sciences Warsaw, Poland, info: <http://www.stahy2017.org>
- 5) IAHS 2017 General Assembly, July 10-14, 2017, Port Elisabeth, South Africa - "Water and Development: scientific challenges in addressing societal issues" website: <http://cwrr.ukzn.ac.za/iahs/call-for-papers/iahs-2017-in-south-africa---invitation>
- 6) Course on "Emerging Hydrometric Techniques for Discharge Estimation and Rating Curve Development". The Course is organized by the Indian Institute of Technology, Ministry of Human Resource Development and co-led by the national representative IAHS, Tommaso Moramarco, Roorkee, April 2017.

2.5 Scientific Publications (*peer-reviewed papers*)

- 7) Ceola, Serena, et al. "Adaptation of water resources systems to changing society and environment: a statement by the International Association of Hydrological Sciences." *Hydrological Sciences Journal* 61.16 (2016): 2803-2817.
- 8) O'Connell, P. E., Koutsoyiannis, D., Lins, H. F., Markonis, Y., Montanari, A., & Cohn, T. (2016). The scientific legacy of Harold Edwin Hurst (1880–1978). *Hydrological Sciences Journal*, 61(9), 1571-1590.
- 9) McMillan, Hilary, et al. "Panta Rhei 2013–2015: global perspectives on hydrology, society and change." *Hydrological sciences journal* 61.7 (2016): 1174-1191.
- 10) Ceola, S., Montanari, A., Parajka, J., Viglione, A., Blöschl, G., & Laio, F. (2016). Human signatures derived from nighttime lights along the Eastern Alpine river network in Austria and Italy. *Proceedings of the International Association of Hydrological Sciences*, 373, 131-136.

- 11) Aguilar, C., Montanari, A., & Polo, M. J. (2016). Long term prediction of flood occurrence. *Proceedings of the International Association of Hydrological Sciences*, 373, 189-192.
- 12) Pugliese, Alessio, et al. "Geostatistical enhancement of european hydrological predictions." *EGU General Assembly Conference Abstracts*. Vol. 18. 2016. Porto P. (2016). Exploring the effect of different time resolutions to calculate the rainfall erosivity factor R in Calabria, southern Italy. *Hydrological Processes* 30, 1551–1562
- 13) Porto P., Walling D.E., La Spada C., Callegari, G. (2016). Validating the use of ¹³⁷Cs measurements to derive the slope component of the sediment budget of a small catchment in southern Italy. *Land Degradation & Development* 27, 798–810
- 14) Porto P. (2016). International Atomic Energy Agency - Guidelines for Using Fallout Radionuclides to Assess Erosion and Effectiveness of Soil Conservation Strategies - IAEA-TECDOC-CD-1741 *Geomorphology* 261, 299–300.
- 15) Porto P., Walling D.E., Cogliandro V., Callegari, G. (2016). Exploring the potential for using ²¹⁰Pbex measurements within a re-sampling approach to document recent changes in soil redistribution rates within a small catchment in southern Italy. *Journal of Environmental Radioactivity* 164, 158-168.
- 16) Meusburger, K, Mabit, L, Ketterer, M., Park Ji-Hyung, Sandor T., Porto, P., Alewell, C. (2016). A multi-radionuclide approach to evaluate the suitability of ²³⁹⁺²⁴⁰Pu as soil erosion tracer. *Science of the Total Environment*, 566–567, 1489–1499.
- 17) Porto P., Walling D.E., Cogliandro V., Callegari, G. (2016). Validating a mass balance accounting approach to using ⁷Be measurements to estimate event-based erosion rates over an extended period at the catchment scale. *Water Resources Research*, 52, 5285-5300.
- 18) Tauro F., Salvatori S.: "Surface flows from images: ten days of observations from the Tiber River gauge-cam station", *Hydrology Research*, 47(6), nh2016302, 2016.
- 19) Tauro F., Porfiri M., Grimaldi S.: "Surface flow measurements from drones", *Journal of Hydrology*, 540, 240–245, 2016.
- 20) Tauro F., Petroselli A., Porfiri M., Giandomenico L., Bernardi G., Mele F., Spina D., Grimaldi S.: "A novel permanent gauge-cam station for surface flow observations on the Tiber river", *Geoscientific Instrumentation, Methods and Data Systems*, 5(1), 241–251, 2016.
- 21) Tauro F., Olivieri G., Petroselli A., Porfiri M., Grimaldi S.: "Flow monitoring with a camera: A case study on a flood event in the Tiber River", *Environmental Monitoring and Assessment*, 188(2), 118, 2016.
- 22) Tauro F., Petroselli A., Arcangeletti E.: "Assessment of drone-based surface flow observations", *Hydrological Processes*, 30(7), 1114–1130, 2016.
- 23) Tauro F.: "Particle tracers and image analysis for surface flow observations", *WIREs Water*, 3(1), 25–39, 2016.
- 24) Papalexiou, S.M., Dialynas, Y.G., Grimaldi, S. (2016) Hershfield factor revisited: Correcting annual maximum precipitation. *Journal of Hydrology*, 542, pp. 884-895.
- 25) Grimaldi, S., Petroselli, A., Salvadori, G., De Michele, C. (2016) Catchment compatibility via copulas: A non-parametric study of the dependence structures of hydrological responses. *Advances in Water Resources*, 90, pp. 116-133.
- 26) Ciabatta, L., Brocca, L., Massari, C., Moramarco, T., Gabellani, S., Puca, S., Wagner, W. (2016). Rainfall-runoff modelling by using SM2RAIN-derived and state-of-the-art satellite rainfall products over Italy. *International Journal of Applied Earth Observation and Geoinformation*, 48, 163-173, doi:10.1016/j.jag.2015.10.004.
- 27) Ciabatta, L., Camici, S., Brocca, L., Ponziani, F., Stelluti, M., Berni, N., Moramarco, T. (2016). Assessing the impact of climate-change scenarios on landslide occurrence in Umbria region, Italy. *Journal of Hydrology*, in press, doi:10.1016/j.jhydrol.2016.02.007. <http://dx.doi.org/10.1016/j.jhydrol.2016.02.007>.
- 28) Espejo-Pérez, A.J., Brocca, L., Moramarco, T., Giráldez, J.V., Triantafilis, J., Vanderlinden, K. (2016). Analysis of soil moisture dynamics beneath olive trees. *Hydrological Processes*, in press, doi:10.1002/hyp.10907. <http://dx.doi.org/10.1002/hyp.10907>

- 29) M. J. Tourian, A. Tarpanelli, O. Elmi, T. Qin, L. Brocca, T. Moramarco, N. Sneeuw (2016) Spatiotemporal densification of river water level time series by multimission satellite altimetry, *Water Resource Research*, doi: 10.1002/2015WR017654
- 30) Greco, M., Moramarco, T. Influence of bed roughness and cross section geometry on medium and maximum velocity ratio in open-channel flow (2016) *Journal of Hydraulic Engineering*, 142

3. Activities carried on by Dr. Tommaso Moramarco within the Union during 2016 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
- Invited lecture delivered to the MOXXI First Topical Conference 2016, Frascati, European Space Agency, 21 November, 2016
- Foster the collaboration between IAHS and Hydrological Sciences Division of the European Geosciences Union (EGU) by involving the President of Hydrological Sciences Division of EGU, Prof. Elena Toth.
- With Prof. Alberto Montanari, to promote the nomination of Professor Zbigniew W. Kundzewicz of Potsdam Institute for Climate Impact Research, for the 2017 Dooge Medal (International Hydrology Prize) of IAHS/UNESCO/WMO. The initiative had a positive outcome and Prof. Kundzewicz has been 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 13th 2017, during the IAHS Scientific Assembly in Port Elizabeth, South Africa.
- The endorsement for the nomination of Prof Dan Rosbjerg of Technical University of Denmark, for the Volker Medal International Hydrology Prize, the Volker Medal (International Hydrology Prize) of IAHS/UNESCO/WMO. The initiative was positive and the Professor Emeritus Dan Rosbjerg has been awarded the 2017 IAHS-UNESCO-WMO International Hydrology Prize - Volker medal for his outstanding contributions of hydrological science to the hydrological community and the society at large. The award ceremony will be held on July 13th 2017, during the IAHS Scientific Assembly in Port Elizabeth, South Africa.
- Member of Scientific Committee of Giornate dell'Idrologia della Società Idrologica Italiana 2016, Hydrology Days Conference, Trento 27-29 June. Organized by the Società Idrologica Italiana (www.sii-ihs.it) of the international network of IAHS's scientific associations
- Guest Editor of Special Issue on "Advances in Hydro-Meteorological Monitoring"; *Water – Open Access Journal*. 2016. Contributions from Italian Scientists belonging to different Universities are also collected.

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

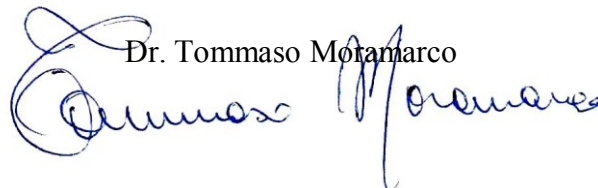
Following, the list of Italian experts:

- 1) Prof. Salvatore Grimaldi. Chair of International Commission on Statistical Hydrology of (ICSH/IAHS)
- 2) Prof. Alberto Montanari. Chair of the International Commission on Water Resource (ICWR/IAHS) and Alternate Italian Delegate in IAHS/IUGG and
- 3) Dr. Tommaso Moramarco. Italian Delegate in IAHS/IUGG, Member of the Italian Commission CNR-IUGG, President of the *Italian Hydrological Society*.
- 4) Dr. Flavia Tauro. Chair of the MOXXI Working Group (Measurements & Observations in XXI Century); Associate Editor of IAHS Hydrological Sciences Journal
- 5) Prof. Elena Toth. President of the Division on Hydrological Sciences (HS) – EGU; Vice President of the *Italian Hydrological Society*; Associate Editor of IAHS Hydrological Sciences Journal

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IAHS National Correspondent:
CNR IRPI – National Research Council of Italy

Dr. Tommaso Moramarco


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