



## Preface: Hydrological Sciences in the Anthropocene – a structured community effort

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The International Association of Hydrological Sciences (IAHS) celebrated its centennial in 2022 during the 11th Scientific Assembly held over 29 May–3 June in Montpellier (France); and is celebrating in 2024 a century of publications. This volume materializes the proceedings of the 2022 Assembly and marks the anniversary of the long-term publication dynamics, with articles tackling very actual problems and questions, from across many countries of the World.

The International Association of Hydrological Sciences/Association Internationale des Sciences Hydrologiques (IAHS) was created in 1922 in Rome (Italy) in the form of the International Section of Scientific Hydrology/Section Internationale d'Hydrologie Scientifique of the International Union of Geodesy and Geophysics/Union Internationale de Géodésie et Géophysique (IUGG), itself member of the International Research Council/Conseil International de Recherches both created in 1919 in Brussels

(Belgium) (Nature, 1928; Schroeder-Gudehus, 2014, Ismail-Zadeh and Joselyn, 2019) (Names in French language are kept here as it was the language used for the proceedings at the time). The IAHS developed over a century as described by Rosbjerg and Rodda (2019), alongside the parent IUGG (Joselyn and Ismail-Zadeh, 2019; Joselyn et al., 2019) and sister learned societies (including the emergence in 2007 of the International Association of Cryospheric Sciences (IACS); Allison et al., 2019) and with strong partnerships in the United Nations system, in particular with UNESCO IHP and WMO (see e.g. Young et al., 2015a, b; Dixon et al., 2022).

The records of the first plenary meeting of the Section in 1924 shaped the first volume of the Section's bulletin (Section Internationale d'Hydrologie Scientifique, 1924), which then became the Red Book series in 1951 with volume 32 (where the red colour was first used to highlight the cover).

This Red Book series developed on an irregular event/opportunity based rationale until volume 368 in 2015, when it was transformed into the *Proceedings of IAHS (PIAHS)* open access journal (since volume 369 in 2015, with a transitioning integration of volumes 364–368) until this current volume 385. From this publication dynamic emerged in parallel in 1956 the regular Bulletin d'Information de l'Association d'Hydrologie Scientifique (Tison, 1956), which then became the still very active *Hydrological Sciences Journal (HSJ)*. Ten special volumes (Blue Books) and nine thematic compilations (Benchmark Papers in Hydrology) have also been published since 1989 and 2006, respectively. This century-long series of publications is the oldest and the longest one in international hydrology (<https://iahs.info/Publications-News/>, last access: 27 October 2024). It has been developed and maintained with intrinsic values which were precursors of the actual Open Science paradigm, articulating science quality with multilingualism, proactive diversity of topics and origins, and processing of both science and operation-oriented knowledge (see e.g. Koutsoyiannis and Kundzewicz, 2007; Cudennec and Hubert, 2008; Koutsoyiannis et al., 2016; Quinn et al., 2018). It has also been relying on peer-editorial volunteership, based on associative in-house publication skills and recent balanced partnerships with publishers (Copernicus for *PIAHS* and Taylor and Francis for *Hydrological Sciences Journal*), and minimised or no cost (EUR 30 per published page for *PIAHS* usually imbedded in a conference budget; free access to *HSJ* for scientists from low-income countries; long history of pre-digital free dissemination towards key libraries across the World ...). The rich records of this publication process are available online thanks to a strong effort of archive rescuing coordinated in the 2000's, and the open access policy of *PIAHS* and *HSJ*.

The Montpellier Scientific Assembly was postponed from the initial plan of 2021 because of the COVID pandemic. Despite some residual limitations in travelling from some countries, the Assembly was a successful event organised by a robust and agile local organising committee (grounded in the ICiReWaRD UNESCO Category 2 Center) in partnership with the IAHS governance, which gathered 595 individuals from 57 countries (20 European, 17 African, 10 Asian, 5 South American, 3 North American, 2 Oceanian). Delegates enjoyed the pleasure of meeting again (Fig. 1) to present and discuss science; and to remember the retrospective, benefit from the ongoing, and co-design the future dynamics of IAHS. The latter was facilitated by the momentum and ambience of the progressing state of the art facilitated by commissions and working groups; of bringing the Pantia Rhei decade to a close; of interacting about the Unsolved Problems in Hydrology (UPHs) agenda; of brainstorming about the next decade; and of debating about the paradigm shift of Open Science, the design of the new [iahs.info](https://iahs.info) website, the Digital Water Globe, the way to improve the contribution of science to solve the water-related societal challenges, the values and mechanisms of IAHS to facilitate the cor-

porate and inclusive progress (see ISC, 2021; IAHS, 2022). This included debates about hybridisation of onsite and online mechanisms, as experienced for the design of Pantia Rhei and of UPHs (Montanari et al., 2013; Blöschl et al., 2019) and knowing the acceleration experienced during the COVID crisis. Cudennec (2024) keeps track of the ten retrospective posters which were curated from the publication and associative records, and displayed during the assembly; and further accompanies with a poetic celebration of the values, history and dynamics of IAHS. Collins et al. (2024), Uysal et al. (2024b) and Volpi et al. (2024) take the opportunity to celebrate the history, legacy and perspectives of respectively the International Commission of Continental Erosion (ICCE), the International Commission on Water Resources Systems (ICWRS), and the International Commission of Statistical Hydrology (ICSH).

Hydrological sciences address multiple compartments, processes, contexts, levels of organisation and scales, which relate to ecological and societal dynamics in terms of environmental determinants, resources, hazards and vectors of compounds. These refer to variability of water quantity and quality; to linkages in particular with human settlements, land use, health, energy, agri-food; and to matters for naturalism, engineering, management, policy, regulation. Ultimately these strongly underlie human rights and dignity, culture, art, socio-economy, development, sustainability, geopolitics, security and foresight. These aspects are at the core of the IAHS history and corporate progress, as shown by the records, with a persistent agenda setting, innovative and synthesis approach in terms of metrology, perception and understanding, conceptualisation and modelling, comparison and standardising. As the World is vast and hydrology materialises heterogeneously, as density and quality of observations and data are critical, as the water dynamics are imbedded in a systemic change, as new societal issues emerge, the science front remains vast. Recently, persistent, revisited and emerging scientific questions have been identified through a community process in the UPH agenda (Blöschl et al., 2019). Prediction in Ungauged Basins has been tackled and corporately advanced during the 2003–2012 decade (Sivapalan et al., 2003; Blöschl et al., 2013; Hrachowitz et al., 2013). Challenges about new observation techniques and emerging citizen sciences have been conceptualised (Tauro et al., 2018; Rangelcroft et al., 2021; Nardi et al., 2022; Manfreda et al., 2024). A snapshot of the state of the art about the epistemic, operational and ethical chaining of data-information-knowledge and of data-products-services has been proposed (Cudennec et al., 2020, 2022a), in synchronisation with the shaping of the Open Science paradigm (UNESCO, 2021; Boulton, 2021; Cudennec et al., 2022b; Hall et al., 2022).

The topic of change emerged early in the IAHS debates and achievements, from the assessment methods (e.g. Simojoki, 1960; Maniak, 1968; Blackie, 1970) to the support of management decisions and societal transformations (e.g.



**Figure 1.** Group photo of IAHS2022, Montpellier (credit: IAHS).

Dennisson and Simpson, 1973; Shamir and Loucks, 1989) and to the exploration of plausible futures (e.g. Kundzewicz et al., 1987; Oki et al., 2006). The topic of change has been tackled as a community priority through the Panta Rhei 2013–2022 decade (Montanari et al., 2013; Ceola et al., 2016; McMillan et al., 2016; Di Baldassarre et al., 2019; Tian et al., 2025; Kreibich et al., 2025), which identified and facilitated a corporate progress on hydrological and socio-hydrological questions in the frame of the Anthropocene, seen as the syndrome of planetary change (Steffen et al., 2011; Bai et al., 2016; Brondizio et al., 2016; Moore et al., 2024) beyond the strict stratigraphic debate (Henderson and Vachula, 2024; Nature, 2024; Richter et al., 2024; Zalasiewicz et al., 2024). The priority on change in the Anthropocene is strong in the UPH Agenda. The new IAHS decade 2023–2032 HELPING, which has just been shaped via a corporate process in a face-to-face/online hybrid mode (Arheimer et al., 2024), prioritises efforts on Science for Solutions in the accelerating developments of the Anthropocene across water-related stakes, levels, scales, contexts and stakeholders.

The scientific programme of the IAHS 2022 Assembly in Montpellier was structured into symposia and workshops proposed and convened by IAHS' commissions, working groups and partners, and was consistent with the above priorities (<https://meetingorganizer.copernicus.org/IAHS2022/sessionprogramme>, last access: 27 October 2024). All authors who presented in oral or poster form (437 and 148, respectively) at the Assembly were welcome to submit an article for this *PIAHS* volume. All submissions went through a strict and constructive peer review. The clustering of articles into sections is aligned with the above priorities, as follows: Time variability and change (Asmael et al., 2024; Ben Alaya et al., 2024; Cetina et al., 2024; Follett et al., 2024; Kreis et al., 2024a; Ndiaye et al., 2024; Thakur et al., 2024; Uysal et al., 2024a; Woyessa, 2024); Space variability and scaling (Allam et al., 2024; Kodja et al., 2024; Mokua et al., 2024; Orieschnig and Cavus, 2024); Variability of extremes (Amalaman et al., 2024; Dembélé et al., 2024; Nair et al., 2024; Rosbjerg, 2024b; Senbeta et al., 2024); Interfaces in hydrology (Hadj-Said et al., 2024; Lanini et al., 2024; Lemaire et al., 2024; Mohamed et al., 2024; Ahéhéhinnou Yêdo et al., 2024); Measurements and data (Arnone et



al., 2024; Bodian et al., 2024; Estácio et al., 2024; Hanich et al., 2024; Kreis et al., 2024b; Mazzoglio et al., 2024; Navas et al., 2024; Omar et al., 2024; Ouachani et al., 2024; Yao et al., 2024); Modelling methods (Ajjur and Al-Ghamdi, 2024; Amoussou et al., 2024; Beven et al., 2024; Gbohoui et al., 2024; Jay-Allemand et al., 2024; Kouadio et al., 2024; Onyutha, 2024; Pesce et al., 2024; Savenije, 2024; Tanguy et al., 2024); Interfaces with society (Andreu et al., 2024; da S. Alves et al., 2024; Diémé et al., 2024; Garin et al., 2024; Gesualdo et al., 2024; Hzami et al., 2024; Nortes Martinez et al., 2024; Petrucelli et al., 2024; Ogbu et al., 2024; Pacheco and Alves, 2024; Rosbjerg, 2024a); A focus on water and agriculture (Abid et al., 2024; Chakhar et al., 2024; Contreras et al., 2024; Ferchichi et al., 2024; Khardi et al., 2024; Mekki et al., 2024; Merheb et al., 2024; Romashchenko et al., 2024; Saracho et al., 2024; Sousa et al., 2024; Vandôme et al., 2024); and a Focus on Open Science (Benveniste et al., 2024; Legay et al., 2024; Loree et al., 2024; Nonki et al., 2024; Paturel et al., 2024; Yépez et al., 2024). First 7 are clusters of UPH as identified by Blöschl et al. (2019). Last two are foci which have been much represented and discussed in IAHS2022.

As in any edited volume, such a chaptering offers an intra-volume consistency and curation for a reader who considers the volume as such. Yet, for a literature reviewer in the actual busy landscape of scientific publication and communication, or a text miner, finding and assimilating all articles and results which contribute to a scientific question is a digital, cognitive and epistemic challenge. For that reason, using standard keywords in order to label articles against ad hoc initiatives, questions, agenda items can be helpful (Stein et al., 2022). This was identified within IAHS some years ago (and caught by Quinn et al., 2018) and is actively proposed by *HSJ* and by the Water Digital Globe (<https://iahs.info/Initiatives/digital-water-globe/>, last access: 27 October 2024) with UPHs, SDGs and their targets. It has also been proposed to authors publishing in this *PIAHS* volume as a bulk experiment with the following rationale for listing labelling and free keywords:

- If relevant: “UPH” or “UPH xx”, where xx is the number between 1 and 23 as in Blöschl et al. (2019)
- If relevant: “SDG”, “SDG xx”, “SDG xx.yy”, where xx is the number of the SDG between 1 and 17 or xx.yy the number of the specific target, as per the Agenda 2030 mechanism.
- Other possible keywords related to an Agenda setting initiative, whenever relevant, or main approach: “Open science”, “PUB”, “Panta Rhei”, “Citizen science”, “New monitoring”, “Field observation”, “Conceptualisation”, “Modelling”, “Indicator”, “Visualisation”
- 1–2 free geographic/hydrographic keywords

**Table 1.** Occurrences of labelling keywords.

Keyword	Number of occurrences	References we consider could have been made
PUB	4	
Panta Rhei	2	
UPH1	5	
UPH2	1	3
UPH3	1	5
UPH4		
UPH5	2	
UPH6	3	
UPH7	1	
UPH8		
UPH9	2	
UPH10		
UPH11		
UPH12	1	
UPH13	2	
UPH14		
UPH15		1
UPH16	7	4
UPH17	3	
UPH18	3	
UPH19	8	
UPH20	4	2
UPH21	6	
UPH22	4	1
UPH23		
SDG2	1	
SDG6	9	
SDG6.4	1	
SDG6.5	2	
SDG6.6	1	
SDG7	1	
SDG11	1	
SDG11.5	1	
SDG13	5	
SDG13.1	2	
SDG13.3	1	
SDG16	1	

- 1–2 free thematic/process/methodological keywords

Table 1 shows how this proposition of labelling keywords has been used across the articles of this volume (completed by free keywords). One can see that PUB is still referred to even if the decade was closed in 2012, confirming that the wavelength of such an agenda is much longer than the decadal time window. References to Panta Rhei are not many, but can be detected through the use of several of the UPHs which extend Panta Rhei questions. No reference to the new HELPING decade is explicit as it was formulated after, but the ambition of having a science-for-solution approach was in the air in IAHS2022 and can definitely be identified across this volume, with references to SDGs and their targets, and beyond. The experiment of encouraging authors to curate their

article with proposed labelling keywords proves to be useful; yet incomplete as it appears that some articles could have been explicitly labelled more completely and/or precisely. This confirms that scientific review and synthesis still require a blend of knowledge management procedures and of expert intelligence. This further confirms – we believe – the relevance of a 100 years-old learned society like IAHS in an epoch where hydrology is critical to understand and mitigate the Anthropocene syndrome, where science is at stake in the (dis)information society, and where “Artificial Intelligence” has to be developed without biases and kept smart.

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## References

- Abid, N., Bargaoui, Z., Ben Jaafar, A., and Mannaerts, C. M.: Comparison of Actual Evapotranspiration assessment by satellite-based model SEBS and hydrological model BBH in northern Tunisia, *Proc. IAHS*, 385, 471–476, <https://doi.org/10.5194/piahs-385-471-2024>, 2024.
- Ahéhéhinou Yêdo, M. F., Amoussou, E., Ahouansou, D. M. M., Kodja, D. J., and Totin Vodounon, S. H.: Continental fishery and risk of contamination of the halieutic ecosystems in the gbaga lagoon channel (Benin-Togo coastal zone), *Proc. IAHS*, 385, 449–455, <https://doi.org/10.5194/piahs-385-449-2024>, 2024.
- Ajjur, S. B. and Al-Ghamdi, S. G.: Runoff uncertainty associated with global climate model chosen in regional climate modeling, *Proc. IAHS*, 385, 333–337, <https://doi.org/10.5194/piahs-385-333-2024>, 2024.
- Allam, A., Moussa, R., Najem, W., and Bocquillon, C.: Hydrological Characterization of Mediterranean Catchments, *Proc. IAHS*, 385, 103–109, <https://doi.org/10.5194/piahs-385-103-2024>, 2024.
- Allison, I., Fierz, C., Hock, R., Mackintosh, A., Kaser, G., and Nussbaumer, S. U.: IACS: past, present, and future of the International Association of Cryospheric Sciences, *Hist. Geo Space Sci.*, 10, 97–107, <https://doi.org/10.5194/hgss-10-97-2019>, 2019.
- Amalaman, M. A., Mahé, G., Diomande, B. I., Tra Bi, A. Z., Rouché, N., Nouaceur, Z., and Laignel, B.: Analyse en ondelettes des séries temporelles aux stations de pluies et débits dans le bassin versant de Tortiya amont (Nord de la Côte d’Ivoire), *Proc. IAHS*, 385, 365–370, <https://doi.org/10.5194/piahs-385-365-2024>, 2024.
- Amoussou, E., Amoussou, F. T., Bossa, A. Y., Kodja, D. J., Totin Vodounon, H. S., Houndénou, C., Borrell Estupina, V., Paturel, J.-E., Mahé, G., Cudennec, C., and Boko, M.: Use of the HEC RAS model for the analysis of exceptional floods in the Ouémé basin, *Proc. IAHS*, 385, 141–146, <https://doi.org/10.5194/piahs-385-141-2024>, 2024.
- Andreu, A., Carpintero, E., Muñoz-Gomez, M. J., Blázquez-Carrasco, Á., and González-Dugo, M. P.: Influence of data spatial resolution in water resources management for oak-savanna distinctive vegetation patches, *Proc. IAHS*, 385, 339–344, <https://doi.org/10.5194/piahs-385-339-2024>, 2024.
- Arheimer, B., Cudennec, C., Castellarin, A., Grimaldi, S., Heal, K. V., Lupton, C., Sarkar, A., Tian, F., Kileshye Onema, J.-M., Archfield, S., Blöschl, G., Borges Chaffe, P. L., Croke, B. F. W., Dembélé, M., Leong, C., Mijic, A., Mosquera, G. M., Nlend, B., OIusola, A. O., Polo, M. J., Sandells, M., Sheffield, J., van Hateren, T. C., Shafiei, M., Adla, S., Agarwal, A., Aguilar, C., Andersson, J. C. M., Andraos, C., Andreu, A., Avanzi, F., Bart, R. R., Bartosova, A., Batelaan, O., Bennett, J. C., Bertola, M., Bezak, N., Boeke, J., Bogaard, T., Booi, M. J., Brigode, P., Buytaert, W., Bziava, K., Castelli, G., Castro, C. V., Ceperley, N. C., Chidepudi, S. K. R., Chiew, F. H. S., Chun, K. P., Dagnew, A. G., Dekongmen, B. W., del Jesus, M., Dezetter, A., do Nascimento Batista, J. A., Doble, R. C., Dogulu, N., Eekhout, J. P. C., Elçi, A., Elenius, M., Finger, D. C., Fiori, A., Fischer, S., Förster, K., Ganora, D., Gargouri Ellouze, E., Ghorishi, M., Harvey, N., Hrachowitz, M., Jampani, M., Jaramillo, F., Jongen, H. J., Kareem, K. Y., Khan, U. T., Kingston, D. G., Koren, G., Krause, S., Kreibich, H., Lerat, J., Liu, J., Madruga de Brito, M., Mahé, G., Makurira, H., Mazzoglio, P., Merheb, M., Mishra, A., Mohammad, H., Montanari, A., Mujere, N., Nabavi, E., Nkwasa, A., Orduna Alegria, M. E., Orieschnig, C., Ovcharuk, V., Palmate, S. S., Pande, S., Pandey, S., Papacharalampous, G., Pechlivanidis, I., Penny, G., Pimentel, R., Post, D. A., Prieto, C., Razavi, S., Salazar-Galán, S., Sankaran, A. S., Santos, P. P., Savenije, H., Shanono, N. J., Sharma, A., Sivapalan, M., Smagulov, Z., Szolgay, J., Teng, J., Teuling, A. J., Teutschbein, C., Tyralis, H., van Griensven, A., van Schalkwyk, A. J., van Tiel, M., Viglione, A., Volpi, E., Wagener, T., Wang-Erlandsson, L., Wens, M., and Xia, J.: The IAHS Science for Solutions decade, with Hydrology Engaging Local People IN a Global world (HELPING), *Hydrolog. Sci. J.*, 69, 1417–1435, <https://doi.org/10.1080/02626667.2024.2355202>, 2024.
- Arnone, E., Treppiedi, D., and Noto, L. V.: Analysis of high-resolution rain records in FVG, northeastern Italy, *Proc. IAHS*, 385, 5–10, <https://doi.org/10.5194/piahs-385-5-2024>, 2024.
- Asmael, N., Dupuy, A., and Leroy, B.: Artificial Recharge of the Shallow Alluvial Aquifer as an Adaptation Strategy in the Garonne Valley, France, *Proc. IAHS*, 385, 53–58, <https://doi.org/10.5194/piahs-385-53-2024>, 2024.
- Bai, X., van der Leeuw, S., O’Brien, K., Berkhout, F., Biermann, F., Brondizio, E. S., Cudennec, C., Dearing, J., Duraïappah, A., Glaser, M., Revkin, A., Steffen, W., and Syvitski, J.: Plausible and desirable futures in the Anthropocene: A new research agenda, *Global Environ. Chang.*, 39, 351–362, <https://doi.org/10.1016/j.gloenvcha.2015.09.017>, 2016.
- Ben Alaya, M., Taupin, J.-D., Msaddek, M. H., Ayari, I., Patris, N., Chaabene, N., Toumi, B., and Melki, F.: Application of Geochemical and Isotopic Tools to Investigate Water Recharge and Salinization in a Coastal Phreatic Aquifer Suffering Severe Natural and Anthropogenic Constraints: Case of the Mornag Aquifer, NE Tunisia, *Proc. IAHS*, 385, 327–332, <https://doi.org/10.5194/piahs-385-327-2024>, 2024.
- Benveniste, J., Dinardo, S., Fenoglio-Marc, L., Buchhaupt, C., Scagliola, M., Passaro, M., Nielsen, K., Restano, M., Ambrózio,

- A., Sabatino, G., Orrù, C., and Abis, B.: SAR, SARin, RD-SAR and FF-SAR Altimetry Processing on Demand for Cryosat-2, Sentinel-3 & Sentinel-6 at ESA's Altimetry Virtual Lab, Proc. IAHS, 385, 457–463, <https://doi.org/10.5194/piahs-385-457-2024>, 2024.
- Beven, K., Page, T., Smith, P., Kretzschmar, A., Hankin, B., and Chappell, N.: UPH Problem 20 – reducing uncertainty in model prediction: a model invalidation approach based on a Turing-like test, Proc. IAHS, 385, 129–134, <https://doi.org/10.5194/piahs-385-129-2024>, 2024.
- Blackie, J. R.: Hydrological effects of a change in land use from rain forest to tea plantation in Kenya, IAHS Publ., 97, 312–329, <https://iahs.info/uploads/dms/3652.312-329-97-Blackie-opt.pdf> (last access: 15 July 2024), 1970.
- Blöschl, G., Sivapalan, M., Wagener, T., Viglione, A., and Savenije, H.: Runoff Prediction in Ungauged Basins: Synthesis across Processes, Places and Scales, Cambridge University Press, Cambridge, <https://doi.org/10.1017/CBO9781139235761>, 2013.
- Blöschl, G., Bierkens, M. F. P., Chambel, A., Cudennec, C., Destouni, G., Fiori, A., Kirchner, J. W., McDonnell, J. J., Savenije, H. H. G., Sivapalan, M., Stumpp, C., Toth, E., Volpi, E., Carr, G., Lupton, C., Salinas, J., Széles, B., Viglione, A., Aksoy, H., Allen, S. T., Amin, A., Andréassian, V., Arheimer, B., Aryal, S., Baker, V., Bardsley, E., Barendrecht, M.H., Bartosova, A., Batelaan, O., Berghuijs, W.R., Beven, K., Blume, T., Bogaard, T., de Amorim, P. B., Böttcher, M. E., Boulet, G., Breinl, K., Brilly, M., Brocca, L., Buytaert, W., Castellarin, A., Castelletti, A., Chen, X., Chen, Y., Chen, Y., Chiffard, P., Claps, P., Clark, M., Collins, A., Croke, B., Dathe, A., David, P. C., de Barros, F. P. J., de Rooij, G., Di Baldassarre, G., Driscoll, J. M., Dühmann, D., Dwivedi, R., Eris, E., Farmer, W. H., Feiccabrino, J., Ferguson, G., Ferrari, E., Ferraris, S., Fersch, B., Finger, D., Foglia, L., Fowler, K., Gartsman, B., Gascoïn, S., Gaume, E., Gelfan, A., Geris, J., Gharari, S., Gleeson, T., Glendell, M., Bevacqua, A. G., González-Dugo, M. P., Grimaldi, S., Gupta, A. B., Guse, B., Han, D., Hannah, D., Harpold, A., Haun, S., Heal, K., Helfricht, K., Herrnegger, M., Hipsey, M., Hlaváčiková, H., Hohmann, C., Holko, L., Hopkinson, C., Hrachowitz, M., Illangasekare, T. H., Inam, A., Innocente, C., Istanbuluoglu, E., Jarihani, B., Kalantari, Z., Kalvans, A., Khanal, S., Khatami, S., Kiesel, J., Kirkby, M., Knoben, W., Kochanek, K., Kohnova, S., Kolechkina, A., Krause, S., Kremer, D., Kreibich, H., Kunstmann, H., Lange, H., Liberato, M. L. R., Lindquist, E., Link, T., Liu, J., Loucks, D.P., Luce, C., Mahé, G., Makarieva, O., Malard, J., Mashtayeva, S., Maskey, S., Mas-Pla, J., Mavrova-Guirguinova, M., Mazzoleni, M., Mermild, S., Misstear, B. D., Montanari, A., Müller-Thomy, H., Nabizadeh, A., Nardi, F., Neal, C., Nesterova, N., Nurtaev, B., Odongo, V., Panda, S., Pande, S., Pang, Z., Papacharalampous, G., Perrin, C., Pfister, L., Pimentel, R., Polo, M. J., Post, D., Sierra, C. P., Ramos, M.-H., Renner, M., Reynolds, J. E., Ridolfi, E., Rigon, R., Riva, M., Robertson, D., Rosso, R., Roy, T., Sá, J. H. M., Salvadori, G., Sandells, M., Schaeffli, B., Schumann, A., Scolobig, A., Seibert, J., Servat, E., Shafiei, M., Sharma, A., Sidibe, M., Sidle, R. C., Skaugen, T., Smith, H., Spiessl, S. M., Stein, L., Steinsland, I., Strasser, U., Su, B., Szolgay, J., Tarboton, D., Tauro, F., Thirel, G., Tian, F., Tong, R., Tussupova, K., Tyralis, H., Uijlenhoet, R., van Beek, R., van der Ent, R. J., van der Ploeg, M., van Loon, A. F., van Meerveld, I., van Nooijen, R., van Oel, P. R., Vidal, J.-P., von Freyberg, J., Vorogushyn, S., Wachniew, P., Wade, A., Ward, P., Westerberg, I., White, C., Wood, E. F., Woods, R., Xu, Z., Yilmaz, K. K., and Zhang Y.: Twenty-three Unsolved Problems in Hydrology (UPH) – a community perspective, Hydrolog. Sci. J., 64, 1141–1158, <https://doi.org/10.1080/02626667.2019.1620507>, 2019.
- Bodian, A., Ndiaye, P. M., Diop, S. B., Diop, L., Dezetter, A., Ogilvie, A., and Djaman, K.: Evaluation and calibration of alternative methods for estimating reference evapotranspiration in the main hydrosystems of Senegal: Senegal, Gambia and Casamance River Basins, Proc. IAHS, 385, 415–421, <https://doi.org/10.5194/piahs-385-415-2024>, 2024.
- Boulton, G. S.: Science as a global public good, International Science Council Position Paper, 21 pp., [https://council.science/wp-content/uploads/2020/06/Science-as-a-global-public-good\\_v041021.pdf](https://council.science/wp-content/uploads/2020/06/Science-as-a-global-public-good_v041021.pdf) (last access: 27 October 2024), 2021.
- Brondizio, E. S., O'Brien, K., Bai, X., Biermann, F., Steffen, W., Berkhout, F., Cudennec, C., Lemos, M. C., Wolfe, A., Palma-Oliveira, J., and Chen, A. C.-T.: Re-conceptualizing the Anthropocene: A call for collaboration, Global Environ. Chang., 39, 318–327, <https://doi.org/10.1016/j.gloenvcha.2016.02.006>, 2016.
- Ceola, S., Montanari, A., Krueger, T., Dyer, F., Kreibich, H., Westerberger, I., Carr, G., Cudennec, C., Elshorbagy, A., Savenije, H., van der Zaag, P., Rosbjerg, D., Aksoy, H., Viola, F., Petrucci, G., MacLeod, K., Croke, B., Ganora, D., Hermans, L., Polo, M. J., Xu, Z., Borgia, M., Helmschrot, J., Toth, E., Ranzi, R., Castellarin, A., Hurford, A., Brilly, M., Viglione, A., Blöschl, G., Sivapalan, M., Domeneghetti, A., Marinelli, A., and Di Baldassarre, G.: Adaptation of water resources systems to changing society and environment – A statement by the International Association of Hydrological Sciences, Hydrolog. Sci. J., 61, 2803–2817, <https://doi.org/10.1080/02626667.2016.1230674>, 2016.
- Cetina, M. A., Taupin, J.-D., Gómez, S., and Patris, N.: Isotope study of monthly rainfall and its response in the Santos Formation phreatic aquifer, Mesa de Los Santos, Santander (Colombia), Proc. IAHS, 385, 231–237, <https://doi.org/10.5194/piahs-385-231-2024>, 2024.
- Chakhar, A., Zitouna-Chebbi, R., Hernández-López, D., Ballesteros, R., Mahjoub, I., and Moreno, M. A.: Assessing the Accuracy of Multiple Classification Algorithms Combining Sentinel-1 and Sentinel-2 for the Citrus Crop Classification and spatialization of the Actual Evapotranspiration Obtained from Flux Tower Eddy Covariance: Case Study of Cap Bon, Tunisia, Proc. IAHS, 385, 443–448, <https://doi.org/10.5194/piahs-385-443-2024>, 2024.
- Collins, A. L., Walling, D. E., Golosov, V., Porto, P., Gellis, A. C., da Silva, Y. J., and Chalov, S.: The International Commission on Continental Erosion (ICCE): a brief overview of its scientific focus and example outputs, Proc. IAHS, 385, 489–497, <https://doi.org/10.5194/piahs-385-489-2024>, 2024.
- Contreras, E., Pimentel, R., Aguilar, C., Aparicio, J., and Polo, M. J.: Quantifying irrigation returns into a highly human managed wetland using remote sensing: The Primera de Palos freshwater lagoon (Spain), Proc. IAHS, 385, 297–303, <https://doi.org/10.5194/piahs-385-297-2024>, 2024.
- Cudennec, C.: 100 Years of IAHS – Graphic capitalisation and poetic celebration, Proc. IAHS, 385, 499–500, <https://doi.org/10.5194/piahs-385-499-2025>, 2025.

- Cudennec, C. and Hubert, P.: Multi-objective role of HSJ in processing and disseminating hydrological knowledge, *Hydrolog. Sci. J.*, 53, 485–487, <https://doi.org/10.1623/hysj.53.2.485>, 2008.
- Cudennec, C., Lins, H., Uhlenbrook, S., and Arheimer, B.: Towards FAIR and SQUARE hydrological data, *Hydrolog. Sci. J.*, 65, 681–682, <https://doi.org/10.1080/02626667.2020.1739397>, 2020.
- Cudennec, C., Lins, H., Uhlenbrook, S., Amani, A., and Arheimer, B.: Operational, epistemic and ethical value chaining of hydrological data to knowledge and services: a watershed moment, *Hydrolog. Sci. J.*, 67, 2363–2368, <https://doi.org/10.1080/02626667.2022.2150380>, 2022a.
- Cudennec, C., Sud, M., and Boulton, G.: Governing Open Science, *Hydrolog. Sci. J.*, 67, 2359–2362, <https://doi.org/10.1080/02626667.2022.2086462>, 2022b.
- da S. Alves, R., Linhares, S. S., Möbus, G., Gasmi, H., Martins, E. S. P. R., Rocha, R. V., and Estácio, A. B. S.: Effects of the latest drought on the alluvial aquifer of a semi-arid region in northeastern Brazil, *Proc. IAHS*, 385, 225–229, <https://doi.org/10.5194/piahs-385-225-2024>, 2024.
- Dembélé, M., Vrac, M., Ceperley, N., Zwart, S. J., Larsen, J., Dadsen, S. J., Mariéthoz, G., and Schaeffli, B.: Future shifting of annual extreme flows under climate change in the Volta River basin, *Proc. IAHS*, 385, 121–127, <https://doi.org/10.5194/piahs-385-121-2024>, 2024.
- Dennisson, E. and Simpson, F.: Hydrogeologic and economic factors in decision making under uncertainty for ornative subsurface disposal of fluid wastes, Northern Williston Basin, Saskatchewan, Canada, *IAHS Publ.*, 110, 879–927, [https://iahs.info/uploads/dms/iahs\\_111\\_879.pdf](https://iahs.info/uploads/dms/iahs_111_879.pdf) (last access: 15 July 2024), 1973.
- Di Baldassarre, G., Sivapalan, M., Rusca, M., Cudennec, C., Garcia, M., Kreibich, H., Konar, M., Mondino, E., Mård, J., Pande, S., Sanderson, M. R., Tian, F., Viglione, A., Wei, J., Wei, Y., Yu, D. J., Srinivasan, V., and Blöschl, G.: Sociohydrology: Scientific challenges in addressing the sustainable development goals, *Water Resour. Res.*, 55, 6327–6355, <https://doi.org/10.1029/2018WR023901>, 2019.
- Diémé, L. P., Bouvier, C., Bodian, A., and Sidibé, A.: Flood monitoring system in the Dakar agglomeration (Senegal), *Proc. IAHS*, 385, 175–180, <https://doi.org/10.5194/piahs-385-175-2024>, 2024.
- Dixon, H., Sandström, S., Cudennec, C., Lins, H., Abrate, T., Bérod, D., Chernov, I., Ravalitera, N., Sighomnou, D., and Teichert, F.: Intergovernmental cooperation for hydrometry – what, why, how?, *Hydrolog. Sci. J.*, 67, 2552–2566, <https://doi.org/10.1080/02626667.2020.1764569>, 2022.
- Estácio, Á. B. S., Vieira, L., Linhares, S., Alves, R., Rocha, R., and Martins, E.: Estimating the water balance of a small reservoir in the Brazilian semiarid, *Proc. IAHS*, 385, 291–296, <https://doi.org/10.5194/piahs-385-291-2024>, 2024.
- Ferchichi, I., Zairi, A., and Marlet, S.: Water scarcity conflicts in a community managed irrigation system in Northern Tunisia: Supporting dialogue and negotiation, *Proc. IAHS*, 385, 253–258, <https://doi.org/10.5194/piahs-385-253-2024>, 2024.
- Follett, E., Beven, K., Hankin, B., Mindham, D., and Chappell, N.: The importance of retention times in Natural Flood Management interventions, *Proc. IAHS*, 385, 197–201, <https://doi.org/10.5194/piahs-385-197-2024>, 2024.
- Garin, P., Montginoul, M., Lepercq, D., and Chisne, P.: Technical, economic and social rehabilitation of old canals to cope with global change: the case of the Neste Canal (France), *Proc. IAHS*, 385, 371–376, <https://doi.org/10.5194/piahs-385-371-2024>, 2024.
- Gbohoui, Y. P., Yonaba, R., Fowé, T., Elégbédé Manou, B., Bacharou, T., Hountondji, Y.-C., Amoussou, E., Sintondji, L. O., Paturel, J.-E., Karambiri, H., and Yacouba, H.: Comparison of one-site vs. multi-sites calibration schemes for hydrological modelling of nested catchments in the West African Sahel, *Proc. IAHS*, 385, 435–441, <https://doi.org/10.5194/piahs-385-435-2024>, 2024.
- Gesualdo, G. C., R. Benso, M., R. Navarro, F. A., Castillo, L. M., and Mendiondo, E. M.: Mitigating Drought Financial Risk for Water Supply Sector through Index-Based Insurance Contracts, *Proc. IAHS*, 385, 117–120, <https://doi.org/10.5194/piahs-385-117-2024>, 2024.
- Hadj-Said, S., Zeddouri, A., Taupin, J.-D., Patris, N., and Leduc, C.: Recharge and dynamics of the Tamanrasset alluvial aquifer (Algerian Sahara), *Proc. IAHS*, 385, 345–349, <https://doi.org/10.5194/piahs-385-345-2024>, 2024.
- Hall, C. A., Saia, S. M., Popp, A. L., Dogulu, N., Schymanski, S. J., Drost, N., van Emmerik, T., and Hut, R.: A hydrologist’s guide to open science, *Hydrol. Earth Syst. Sci.*, 26, 647–664, <https://doi.org/10.5194/hess-26-647-2022>, 2022.
- Hanich, L., Lahnik, O., Gascoin, S., Chakir, A., and Simonneaux, V.: Quantifying snow sublimation by Eddy covariance measurements on the High Atlas Mountain of Marrakech at Tazaghart plateau, Morocco, *Proc. IAHS*, 385, 387–391, <https://doi.org/10.5194/piahs-385-387-2024>, 2024.
- Henderson, E. D. and Vachula, R. S.: Geologic limitations on a comprehensive Anthropocene, *Anthropocene*, 46, 100434, <https://doi.org/10.1016/j.ancene.2024.100434>, 2024.
- Hrachowitz, M., Savenije, H. H. G., Blöschl, G., McDonnell, J. J., Sivapalan, M., Pomeroy, J. W., Arheimer, B., Blume, T., Clark, M. P., Ehret, U., Fenicia, F., Freer, J. E., Gelfan, A., Gupta, H. V., Hughes, D. A., Hut, R. W., Montanari, A., Pande, S., Tetzlaff, D., Troch, P. A., Uhlenbrook, S., Wagener, T., Winsemius, H. C., Woods, R. A., Zehe, E., and Cudennec, C.: A decade of Predictions in Ungauged Basins (PUB) – a review, *Hydrolog. Sci. J.*, 58, 1198–1255, <https://doi.org/10.1080/02626667.2013.803183>, 2013.
- Hzami, A., Amrouni, O., Heggy, E., Mahé, G., and Missaoui, H.: On the Growing Socioeconomic Vulnerability of Southern Mediterranean Coastal Lagoons, *Proc. IAHS*, 385, 377–385, <https://doi.org/10.5194/piahs-385-377-2024>, 2024.
- IAHS (International Association of Hydrological Sciences): IAHS statement on commitment to Equality, Diversity and Inclusion, *IAHS*, <https://iahs.info/About-IAHS/about-iahs/> (last access: 27 October 2024), 2022.
- ISC (International Science Council): A contemporary perspective on the free and responsible practice of science in the 21st century, *ISC*, [https://council.science/wp-content/uploads/2020/06/A-contemporary-perspective-on-the-free-and-responsible-perspective-of-science-in-the-21st-century\\_paper.pdf](https://council.science/wp-content/uploads/2020/06/A-contemporary-perspective-on-the-free-and-responsible-perspective-of-science-in-the-21st-century_paper.pdf) (last access: 27 October 2024), 2021.
- Ismail-Zadeh, A. and Joselyn, J. A.: IUGG: beginning, establishment, and early development (1919–1939), *Hist. Geo Space. Sci.*, 10, 25–44, <https://doi.org/10.5194/hgss-10-25-2019>, 2019.



- Jay-Allemand, M., Demargne, J., Garambois, P.-A., Javelle, P., Gejadze, I., Colleoni, F., Organde, D., Arnaud, P., and Fouchier, C.: Spatially distributed calibration of a hydrological model with variational optimization constrained by physiographic maps for flash flood forecasting in France, *Proc. IAHS*, 385, 281–290, <https://doi.org/10.5194/piahs-385-281-2024>, 2024.
- Joselyn, J. A. and Ismail-Zadeh, A.: IUGG evolves (1940–2000), *Hist. Geo Space. Sci.*, 10, 45–72, <https://doi.org/10.5194/hgss-10-45-2019>, 2019.
- Joselyn, J. A., Ismail-Zadeh, A., Beer, T., Gupta, H., Kono, M., Shamir, U., Sideris, M., and Whaler, K.: IUGG in the 21st century, *Hist. Geo Space. Sci.*, 10, 73–95, <https://doi.org/10.5194/hgss-10-73-2019>, 2019.
- Khadi, Y., Lacombe, G., Dewandel, B., Taky, A., Maréchal, J.-C., Hammani, A., and Bouarfa, S.: Managed groundwater recharge at the farm scale in pre-Saharan Morocco, *Proc. IAHS*, 385, 47–52, <https://doi.org/10.5194/piahs-385-47-2024>, 2024.
- Kodja, D. J., Quenum, G. M. L. D., Koubodana, H. D., Amoussou, E., Akoteyon, I. S., Akognongbé, A. S. J., Ahéhéhinou Yêdo, M. F., Mahé, G., Paturel, J.-E., Vissin, E. W., and Houndénou, C.: Investigation of drought and flooding areas in coastal countries of West Africa in the context of global warming, *Proc. IAHS*, 385, 359–364, <https://doi.org/10.5194/piahs-385-359-2024>, 2024.
- Kouadio, K. C. A., Silué, S., Amoussou, E., Kouassi, K. L., Diedhiou, A., Coulibaly, T. J. H., Obahoundjé, S., Didi, S. R., and Coulibaly, H. S. J.: Using of hydrological model and geospatial tool to assess climate change impact on the hydropower potential of the White Bandama watershed in Côte d’Ivoire (West Africa), *Proc. IAHS*, 385, 39–45, <https://doi.org/10.5194/piahs-385-39-2024>, 2024.
- Koutsyiannis, D. and Kundzewicz, Z. W.: Editorial – Quantifying the impact of hydrological studies, *Hydrolog. Sci. J.*, 52, 3–17, <https://doi.org/10.1623/hysj.52.1.3>, 2007.
- Koutsyiannis, D., Blöschl, G., Bardossy, A., Cudennec, C., Hughes, D., Montanari, A., Neuweiler, I., and Savenije H.: Joint editorial – Fostering innovation and improving impact assessment for journal publications in hydrology, *Water Resour. Res.*, 52, 2399–2402, <https://doi.org/10.1002/2016WR018895>, 2016.
- Kreibich, H., Sivapalan, M., AghaKouchak, A., Addor, N., Aksoy, H., Arheimer, B., Arnbjerg-Nielsen, K., Castro, C.V., Cudennec, C., de Brito, M. M., Di Baldassarre, G., Finger, D. C., Fowler, K., Knoben, W., Krueger, T., Liu, J., Macdonald, E., McMillan, H., Mendiondo, E. M., Montanari, A., Muller, M. F., Pande, S., Tian, F., Viglione, A., Wei, Y., Xia, J., Castellarin, A., Loucks, D. P., Oki, T., Polo Gómez, M. J., Savenije, H., Thompson, S., van Loon, A. F., Agarwal, A., Alvarez-Garreton, C., Andreu, A., Barendrecht, M., Bibikova, T., Brunner, M., Cavalcante, L., Cavus, Y., Ceola, S., Chaffe, P., Chen, X., Coxon, G., Dandan, Z., Davary, K., Dembélé, M., Dewals, B., Gain, A.K., Gelfan, A., Ghoreishi, M., Grabs, T., Hannah, D. M., Helmschrot, J., Höllermann, B., Hounkpè, J., Koebele, E., Konar, M., Kratzert, F., Lindersson, S., Llasat, M.C., Matanó, A., Mazzoleni, M., Mejia, A., Mendoza, P., Merz, B., Mukherjee, J., Saleh, F.N., Nlend, B., Nonki, R.M., Orieschnig, C., Papagianaki, K., Penny, G., Petrucci, O., Pimentel, R., Pool, S., Ridolfi, E., Rusca, M., Sairam, N., Namboothiri, A. S., Sarmento Buarque, A. C., Savelli, E., Schoppa, L., Schröter, K., Scolobig, A., Shafiei, M., Sikorska-Senoner, A. E., Smigaj, M., Teutschbein, C., Thaler, T., Todorovic, A., Tootoonchi, F., Tootoonchi, R., Toth, E., van Nooijen, R., Vanelli, F., Vázquez, N., Walker, D. W., Wens, M., Yu, D. J., Zarei, H., Zhou, C., and Blöschl, G.: Panta Rhei: A decade of progress in research on change in hydrology and society, *Hydrolog. Sci. J.*, in review, 2025.
- Kreis, M. B., Taupin, J.-D., Patris, N., Lachassagne, P., Vergnaud-Ayraud, V., Burte, J. D. P., Leduc, C., and Martins, E. S. P. R.: Multidisciplinary approach to understand the salinization of fractured crystalline aquifers in semi-arid region, *Proc. IAHS*, 385, 393–398, <https://doi.org/10.5194/piahs-385-393-2024>, 2024a.
- Kreis, M. B., Taupin, J.-D., Patris, N., and Martins, E. S. P. R.: Isotopic signature of precipitation in the semi-arid region of Ceará, Northeastern Brazil, *Proc. IAHS*, 385, 17–23, <https://doi.org/10.5194/piahs-385-17-2024>, 2024b.
- Kundzewicz, Z. W., Gottschalk, L., and Webb, B.: *Hydrology 2000*, IAHS Publ. 171, IAHS Press, Wallingford, ISBN 0-947571-41-8, 1987.
- Lanini, S., Ladouche, B., Dewandel, B., Ibba, M., Bailly-Comte, V., and Genevier, M.: Impact of the storm Alex on water exchanges between the Roya River and its alluvial aquifer, *Proc. IAHS*, 385, 275–279, <https://doi.org/10.5194/piahs-385-275-2024>, 2024.
- Legay, T., Aubert, Y., Verdonck, J., Guilhen, J., Paris, A., Martinez, J.-M., Sauvage, S., Datok, P., Dos Santos, V., Sanchez-Perez, J. M., Bruxelles, S., Lavergne, E., and Mercier, F.: How can altimetry data be used for water resources management (SDG 6.5.1)? Development of a method using altimetry data from the Envisat, Jason, Jason 2 and Sentinel 3A satellites, *Proc. IAHS*, 385, 477–484, <https://doi.org/10.5194/piahs-385-477-2024>, 2024.
- Lemaire, B. J., Chaumont, C., Tournebize, J., and Henine, H.: Tracing and hydraulic modelling to assess the hydraulic performance of a constructed wetland, *Proc. IAHS*, 385, 135–140, <https://doi.org/10.5194/piahs-385-135-2024>, 2024.
- Loree, T., Squividant, H., Launay, J., de Lavenne, A., and Cudennec, C.: Uptake by end-users of a PUB approach made available as a Web Service, *Proc. IAHS*, 385, 85–89, <https://doi.org/10.5194/piahs-385-85-2024>, 2024.
- Manfreda, S., Miglino, D., Saddi, K. C., Jomaa, S., Eltner, A., Perks, M., Peña-Haro, S., Bogaard, T., van Emmerik, T. H. M., Mariani, S., Maddock, I., Tauro, F., Grimaldi, S., Zeng, Y., Gonçalves, G., Strelnikova, D., Bussettini, M., Marchetti, G., Lastoria, B., Su, Z., and Rode, M.: Advancing river monitoring using image-based techniques: challenges and opportunities, *Hydrolog. Sci. J.*, 69, 657–677, <https://doi.org/10.1080/02626667.2024.2333846>, 2024.
- Maniak, D.: The change of flood hydrographs by river regulation shown for the example of the Aller-Koler-River-system in Northern Germany, *IAHS Publ.*, 81, 426–430, <https://iahs.info/uploads/dms/17918.426-430-81-Maniak.pdf> (last access: 15 July 2024), 1968.
- Mazzoglio, P., Butera, I., and Claps, P.: Rainfall data augmentation in Northern Italy through daily extremes and the Hershfield factor, *Proc. IAHS*, 385, 147–153, <https://doi.org/10.5194/piahs-385-147-2024>, 2024.
- McMillan, H., Montanari, A., Cudennec, C., Savenije, H., Kreibich, H., Krueger, T., Liu, J., Meija, A., van Loon, A., Aksoy, H., Di Baldassarre, G., Huang, Y., Mazvimavi, D., Rogger, M., Sivakumar, B., Bibikova, T., Castellarin, A., Chen, Y., Finger, D., Gelfan, A., Hannah, D., Hoekstra, A., Li, H., Maskey, S., Mathevet, T., Mijic, A., Acuña, A., Polo, M., Rosales, S., Smith, P., Viglione, A., Srinivasan, V., Toth, E., van Nooijen, R., and



- Xia, J.: Panta Rhei 2013–2015: Global perspectives on hydrology, society and change, *Hydrolog. Sci. J.*, 61, 1174–1191, <https://doi.org/10.1080/02626667.2016.1159308>, 2016.
- Mekki, I., Zitouna-Chebbi, R., Benyoussef, S., Benabdelghaffar, A., Boukari, M., Jacob, F., and Albergel, J.: Analysis of rainfed cereal-legume mixture cropping water productivity in Lebna catchment, Cap-Bon, Tunisia, *Proc. IAHS*, 385, 313–317, <https://doi.org/10.5194/piahs-385-313-2024>, 2024.
- Merheb, M., Cudennec, C., and Nardi, F.: Can we use indicator-based farm sustainability assessment tools for the WEF Nexus?, *Proc. IAHS*, 385, 91–96, <https://doi.org/10.5194/piahs-385-91-2024>, 2024.
- Mohamed, A. S., Leduc, C., Yeslem, S., Tagarinska, G., and Aichete, S.: Impacts of climate variations and human influences on groundwater recharge in the semi-arid Trarza aquifer (SW Mauritania), *Proc. IAHS*, 385, 351–357, <https://doi.org/10.5194/piahs-385-351-2024>, 2024.
- Mokua, R. A., Glenday, J., and Mazvimavi, D.: Evaluating the spatial and temporal variation in baseflow across headwater streams in the Jonkershoek valley, South Africa, *Proc. IAHS*, 385, 239–246, <https://doi.org/10.5194/piahs-385-239-2024>, 2024.
- Montanari, A., Young, G., Savenije, H., Hughes, D., Wagener, T., Ren, L., Koutsoyiannis, D., Cudennec, C., Grimaldi S., Blöschl, G., Sivapalan, M., Beven, K., Gupta, H., Arheimer, B., Huang, Y., Schumann, A., Post, D., Taniguchi, M., Boegh, E., Hubert, P., Harman, C., Thompson, S., Rogger, M., Hipsey, M., Toth, E., Viglione, A., Di Baldassarre, G., Schaeffli, B., McMillan, H., Schymanski, S., Characklis, G., Yu, B., Pang, Z., and Belyaev, V.: “Panta Rhei – Everything Flows”: Change in hydrology and society – The IAHS Scientific Decade 2013–2022, *Hydrolog. Sci. J.*, 58, 1256–1275, <https://doi.org/10.1080/02626667.2013.809088>, 2013.
- Moore, M.L., Wang-Erlandsson, L., Bodin, Ö., Enqvist, J., Jaramillo, F., Jónás, K., Folke, C., Keys, P., Lade, S. J., Mancilla Garcia, M., Martin, R., Matthews, N., Pranindita, A., Rocha, J. C., and Vora, S.: Moving from fit to fitness for governing water in the Anthropocene, *Nat. Water*, 2, 511–520, <https://doi.org/10.1038/s44221-024-00257-y>, 2024.
- Nair, A., Sankaran, A., Geetha Mohan, M., and Vijayalakshmi, S.: Developing Non-Stationary Frequency Relationships for Greater Pamba River basin, Kerala India incorporating dominant climatic precursors, *Proc. IAHS*, 385, 163–173, <https://doi.org/10.5194/piahs-385-163-2024>, 2024.
- Nardi, F., Cudennec, C., Abrate, T., Allouch, C., Annis, A., Assumpção, T. H., Aubert, A. H., Béro, D., Braccini, A. M., Buytaert, W., Dasgupta, A., Hannah, D. M., Mazzoleni, M., Polo, M. J., Sæbø, Ø., Seibert, J., Tauro, F., Teichert, F., Teutonio, R., Uhlenbrook, S., Wahrman Vargas, C., and Grimaldi, S.: Citizens AND Hydrology (CANDHY): conceptualizing a transdisciplinary framework for citizen science addressing hydrological challenges, *Hydrolog. Sci. J.*, 67, 2534–2551, <https://doi.org/10.1080/02626667.2020.1849707>, 2022.
- Nature: The International Research Council, *Nature*, 122, 389–391, <https://doi.org/10.1038/122389a0>, 1928.
- Nature: Editorial – Are we in the Anthropocene yet?, *Nature*, 627, p. 466, <https://doi.org/10.1038/d41586-024-00815-0>, 2024.
- Navas, R., Gamazo, P., and Vervoort, R. W.: Bayesian inference of synthetic daily rating curves by coupling Chebyshev Polynomials and the GR4J model, *Proc. IAHS*, 385, 399–406, <https://doi.org/10.5194/piahs-385-399-2024>, 2024.
- Ndiaye, P. M., Bodian, A., Diop, S. B., Diop, L., Dezetter, A., Ogilvie, A., and Djaman, K.: Trend analysis of reference evapotranspiration and climate variables in the main hydrosystems of Senegal: Senegal, Gambia and Casamance River Basins, *Proc. IAHS*, 385, 305–311, <https://doi.org/10.5194/piahs-385-305-2024>, 2024.
- Nonki, R. M., Amoussou, E., Tshimanga, R. M., Koubo-dana Houteta, D., Kodja, D. J., Kemgang Ghomsi, F. E., and Lenou, A.: Performance assessment of daily GR conceptual rainfall-runoff models in the Upper Benue River (Cameroon) using airGR packages, *Proc. IAHS*, 385, 319–326, <https://doi.org/10.5194/piahs-385-319-2024>, 2024.
- Nortes Martinez, D., Grelot, F., Choley, C., and Finaud-Guyot, P.: Flood impact assessment in urban settings with porous buildings – insights from a fine-scale hydraulic-economic model, *Proc. IAHS*, 385, 247–252, <https://doi.org/10.5194/piahs-385-247-2024>, 2024.
- Ogbu, K. N., Rakovec, O., Samaniego, L., Okafor, G. C., Tischbein, B., and Meresa, H.: Evaluating the skill of the mesoscale Hydrologic Model (mHM) for discharge simulation in sparsely-gauged basins in Nigeria, *Proc. IAHS*, 385, 211–218, <https://doi.org/10.5194/piahs-385-211-2024>, 2024.
- Oki, T., Valeo, C., and Heal, K. (Eds.): *Hydrology 2020: An integrating science to meet world water challenges*. IAHS Publ. 300, IAHS Press, Wallingford, ISBN 978-1-901502-33-3, 2006.
- Omar, G. M., Paturel, J.-E., Salles, C., Mahé, G., Jalludin, M., Satgé, F., Ismail Nour, M., and Hassan Hersi, A.: Comparative study from ground-based rain gauges vs. rainfall products at different time steps in the southeast of the Republic of Djibouti, *Proc. IAHS*, 385, 59–64, <https://doi.org/10.5194/piahs-385-59-2024>, 2024.
- Onyutha, C.: Pros and cons of various efficiency criteria for hydrological model performance evaluation, *Proc. IAHS*, 385, 181–187, <https://doi.org/10.5194/piahs-385-181-2024>, 2024.
- Orieschnig, C. and Cavus, Y.: Spatial characterization of drought through CHIRPS and a station-based dataset in the Eastern Mediterranean, *Proc. IAHS*, 385, 79–84, <https://doi.org/10.5194/piahs-385-79-2024>, 2024.
- Ouachani, R., Bargaoui, Z., and Ouarda, T.: Seasonal precipitation forecasting with large scale climate predictors: a hybrid ensemble empirical mode decomposition-NARX scheme, *Proc. IAHS*, 385, 267–273, <https://doi.org/10.5194/piahs-385-267-2024>, 2024.
- Pacheco, G. C. R. and Alves, C. D. M. A.: The performance of rainwater harvesting systems in the context of deep uncertainties, *Proc. IAHS*, 385, 11–16, <https://doi.org/10.5194/piahs-385-11-2024>, 2024.
- Paturel, J.-E., Kouacou, B., Lohou, F., Pons, F., Dje, K., Coulibaly, N., Karambiri, H., Borrell, V., Ogilvie, A., and Servat, E.: Data rescue and valorization of old climatological data – application to rainfall data in Burkina Faso and Ivory Coast using NUNIEAU software, *Proc. IAHS*, 385, 219–224, <https://doi.org/10.5194/piahs-385-219-2024>, 2024.
- Pesce, M., Viglione, A., von Hardenberg, J., Tarasova, L., Basso, S., Merz, R., Parajka, J., and Tong, R.: Regional multi-objective calibration for distributed hydrological modelling:

- a decision tree based approach, *Proc. IAHS*, 385, 65–69, <https://doi.org/10.5194/piahs-385-65-2024>, 2024.
- Petruccioli, N., Mantecchini, L., Gallazzi, A., Molinari, D., Hamouti, M., Zazzeri, M., Sterlacchini, S., Ballio, F., Brath, A., and Domeneghetti, A.: Qualitative flood risk assessment for road and railway infrastructures: the experience of the MOVIDA project, *Proc. IAHS*, 385, 407–413, <https://doi.org/10.5194/piahs-385-407-2024>, 2024.
- Quinn, N., Blöschl, G., Bárdossy, A., Castellarin, A., Clark, M., Cudennec, C., Koutsoyiannis, D., Lall, U., Lichner, L., Parajka, J., Peters-Lidard, C. D., Sander, G., Savenije, H., Smettem, K., Vereecken, H., Viglione, A., Willems, P., Wood, A., Woods, R., Xu, C.-Y., and Zehe, E.: Joint editorial: Invigorating hydrological research through journal publications, *Hydrol. Earth Syst. Sci.*, 22, 5735–5739, <https://doi.org/10.5194/hess-22-5735-2018>, 2018.
- Rangecroft, S., Rohse, M., Banks, E. W., Day, R., Di Baldassarre, G., Frommen, T., Hayashi, Y., Höllermann, B., Lebek, K., Mondino, E., Rusca, M., Wens, M., and Van Loon, A. F.: Guiding principles for hydrologists conducting interdisciplinary research and fieldwork with participants, *Hydrolog. Sci. J.*, 66, 214–225. <https://doi.org/10.1080/02626667.2020.1852241>, 2021.
- Richter, D. D., Billings, S. A., Brantley, S. L., Gaillardet, J., Markewitz, D., Schlesinger, W. H., Amundson, R., Ashley, G. M., Bacon, A. R., Bales, R. C., Binkley, D., Brecheisen, Z., Calvo-Alvarado, J., Cassar, N., Clifford, C., Derry, L. A., Edgeworth, M., Eppes, M.-C., Fan, Y., Ferguson, T. A., de Graaff, M.-A., Handelsman, J., Hartemink, A. E., Hofmockel, K., Huggett, R. J., Jobbagy, E. G., Kim, H. S., Krishnaswamy, J., Kumar, P., Lozier, S., Lu, L., McDowell, W. H., McNeill, J. R., Oh, N.-H., O'Neill, K., Prendergast, M. E., Richardson, C. J., Richardson, J. B., Schroeder, P. A., Scow, K., Siebe, C., Thompson, A., White, T., Whitlock, C. L., and Wolf, M.: Earth sciences are the model sciences of the Anthropocene, *Perspectives of Earth and Space Scientists*, 5, e2024CN000237, <https://doi.org/10.1029/2024CN000237>, 2024.
- Romashchenko, M., Bohaienko, V., Matiash, T., Shatkovskiy, A., Kolomiets, S., and Danylenko, I.: Conceptual principles of water resources management in irrigated agriculture, *Proc. IAHS*, 385, 111–115, <https://doi.org/10.5194/piahs-385-111-2024>, 2024.
- Rosbjerg, D.: Estimation of expected annual damage, EAD, *Proc. IAHS*, 385, 25–29, <https://doi.org/10.5194/piahs-385-25-2024>, 2024a.
- Rosbjerg, D.: Return periods in current and future climate, *Proc. IAHS*, 385, 485–487, <https://doi.org/10.5194/piahs-385-485-2024>, 2024b.
- Rosbjerg, D. and Rodda, J.: IAHS: a brief history of hydrology, *Hist. Geo Space. Sci.*, 10, 109–118, <https://doi.org/10.5194/hgss-10-109-2019>, 2019.
- Saracho, A., Navas, R., Gamazo, P., and Alvareda, E.: Assessing impacts of irrigation on flows frequency downstream of an irrigated agricultural system by the SWAT model, *Proc. IAHS*, 385, 423–427, <https://doi.org/10.5194/piahs-385-423-2024>, 2024.
- Savenije, H. H. G.: The hydrological system as a living organism, *Proc. IAHS*, 385, 1–4, <https://doi.org/10.5194/piahs-385-1-2024>, 2024.
- Schroeder-Gudehus, B.: *Les scientifiques et la paix*, Presses de l'Université de Montréal, <https://doi.org/10.4000/books.pum.8021>, 2014.
- Section Internationale d'Hydrologie Scientifique: Première réunion plénière de la section (Madrid, Octobre 1924), *Bulletin de la Section Internationale d'Hydrologie Scientifique (de l'Union Géodésique et Géophysique Internationale, du Conseil International de Recherches)*, 1, 24 pp., 1924.
- Senbeta, T. B., Kochanek, K., Karamuz, E., and Napiorkowski, J. J.: Modelling human impacts on surface and sub-surface hydrological drought, *Proc. IAHS*, 385, 155–162, <https://doi.org/10.5194/piahs-385-155-2024>, 2024.
- Shamir, U. and Loucks, P.: Preface – Systems Analysis for Water Resources Management: Closing the Gap Between Theory and Practice, *IAHS Publ.*, 180, v–vi, <https://iahs.info/uploads/dms/7784.Publ180-Preface.pdf> (last access: 15 July 2024), 1989.
- Simojoki, H.: Climatic change and long series of ice observations at Lake Kallavesi, *IAHS Publ.*, 54, 20–24, <https://iahs.info/uploads/dms/1757.20-24-54-Simojoki.pdf> (last access: 15 July 2024), 1960.
- Sivapalan, M., Takeuchi, K., Franks, S. W., Gupta, H., Karambiri, H., Lakshmi, Liang, X., McDonnell, J. J., Mendiondo E. M., O'Connell P. E., Oki, T., Pomeroy, J. W., Schertzer, D., Uhlenbrook, S., and Zehe, E.: IAHS Decade on Predictions in Ungauged Basins (PUB), 2003–2012: Shaping an exciting future for the hydrological sciences, *Hydrolog. Sci. J.*, 48, 857–880, <https://doi.org/10.1623/hysj.48.6.857.51421>, 2003.
- Sousa, D., Alves, C., Vergara, F., Coelho, C., and Ralha, C.: Agent-Based Modelling for representing water allocation methodologies in the irrigation system of the Formoso River Basin, Brazil, *Proc. IAHS*, 385, 71–77, <https://doi.org/10.5194/piahs-385-71-2024>, 2024.
- Steffen, W., Grinevald, J., Crutzen, P., and McNeill, J.: The Anthropocene: conceptual and historical perspectives, *Philos. T. Roy. Soc. A.*, 369, 842–867, <https://doi.org/10.1098/rsta.2010.0327>, 2011.
- Stein, L., Mulkavilli, S. K., and Wagener, T.: Lifelines for a drowning science – improving findability and synthesis of hydrologic publications, *Hydrol. Process.*, 36, e14742, <https://doi.org/10.1002/hyp.14742>, 2022.
- Tanguy, G., Bouvier, C., and Sichoix, L.: Streamflow simulation using the event-based SCS-MS/LR model in the Hitiata catchment, French Polynesia, *Proc. IAHS*, 385, 31–37, <https://doi.org/10.5194/piahs-385-31-2024>, 2024.
- Tauro, F., Selker, J., van de Giesen, N., Abrate, T., Uijlenhoet, R., Porfiri, M., Manfreda, S., Caylor, K., Moramarco, T., Benveniste, J., Ciruolo, G., Estes, L., Domeneghetti, D., Perks, M. T., Corbari, C., Rabiei, E., Ravazzani, G., Bogena, H., Harfouche, A., Brocca, L., Maltese, A., Wickert, A., Tarpanelli, A., Good, S., Lopez Alcala, J. M., Petroselli, A., Cudennec, C., Blume, T., Hut, R., and Grimaldi, S.: Measurements and observations in the XXI century (MOXXI): innovation and multi-disciplinarity to sense the hydrological cycle, *Hydrolog. Sci. J.*, 63, 169–196, <https://doi.org/10.1080/02626667.2017.1420191>, 2018.
- Thakur, C., Kasiviswanathan, K. S., Teutschbein, C., Soundharajan, B.-S., Diwan Mohaideen, M. M., and Budamala, V.: Assessment of Hydrological Changes in Godavari River Basin Under the Impacts of El-Niño, *Proc. IAHS*, 385, 203–209, <https://doi.org/10.5194/piahs-385-203-2024>, 2024.
- Tian, F., Wei, J., Haeffner, M., and Kreibich, H.: Coevolution and prediction of coupled human-water systems, *A socio-hydrologic*

- syntheses of change in hydrology and society, Cambridge University Press, Cambridge, USA, in press, 2025.
- Tison, L. J.: Le bulletin d'information de l'Association Internationale d'Hydrologie Scientifique, *Hydrolog. Sci. J.*, 1, 1–23, <https://doi.org/10.1080/02626665609493638>, 1956.
- UNESCO: Recommendation on Open Science, UNESCO, <https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en> (last access: 27 October 2024), 2021.
- Uysal, G., Dogan, Y. O., Civelek, H. S., Sorman, A. A., and Sensoy, A.: Analyzing the Effects of Climate Change for the Water Tower of Mesopotamia, Türkiye, *Proc. IAHS*, 385, 465–470, <https://doi.org/10.5194/piahs-385-465-2024>, 2024a.
- Uysal, G., Croke, B., Schumann, A., Rosbjerg, D., Simonovic, S. P., Kileshye Onema, J. M., Takeuchi, K., Leong, C., and Loucks, D. P.: Historical synthesis of the International Commission on Water Resources Systems, *Hydrolog. Sci. J.*, 69, 2372–2390, <https://doi.org/10.1080/02626667.2024.2412726>, 2024b.
- Vandôme, P., Leauthaud, C., Moinard, S., Mekki, I., Zairi, A., Charron, F., Leconte, J., Ferchichi, I., Ajmi, T., and Belaud, G.: Exploring ways to improve agricultural water management in two Mediterranean irrigated systems: promises of wireless low-tech sensor networks, *Proc. IAHS*, 385, 429–433, <https://doi.org/10.5194/piahs-385-429-2024>, 2024.
- Volpi, E., Grimaldi, S., Aghakouchak, A., Castellarin, A., Chebana, F., Papalexiou, S. M., Aksoy, H., Bárdossy, A., Cancelliere, A., Chen, Y., Deidda, R., Haberlandt, U., Eris, E., Fischer, S., Francés, F., Kavetski, D., Rodding Kjeldsen, T., Kochanek, K., Langousis, A., Mediero Orduña, L., Montanari, A., Nerantzaki, S. D., Ouarda, T. B. M. J., Prosdocimi, I., Ragnox, E., Rajulapaty, C. R., Requenaz, A. I., Ridolfi, E., Sadegh, M., Schumann, A., and Sharma, A.: The legacy of STAHY: milestones, achievements, challenges, and open problems in statistical hydrology, *Hydrolog. Sci. J.*, 69, 1913–1949, <https://doi.org/10.1080/02626667.2024.2385686>, 2024.
- Woyessa, Y. E.: Assessment of climate change impact and comparison of downscaling approaches: a case study in a semi-arid river basin, *Proc. IAHS*, 385, 97–102, <https://doi.org/10.5194/piahs-385-97-2024>, 2024.
- Yao, C., Kacou, M., Koffi, E. S., Dao, A., Dutremble, C., Guilliard, M., Kamagaté, B., Perrin, J.-L., Salles, C., Neppel, L., Patrel, J.-E., Zahiri, E. P., and Séguis, L.: Rainfall risk over the city of Abidjan (Côte d'Ivoire): first contribution of the joint analysis of daily rainfall from a historical record and a recent network of rain gauges, *Proc. IAHS*, 385, 259–265, <https://doi.org/10.5194/piahs-385-259-2024>, 2024.
- Yépez, S., Salas, F., Nardini, A., Valenzuela, N., Osorio, V., Vargas, J., Rodríguez, R., and Piégay, H.: Semi-automated morphological characterization using South Rivers Toolbox, *Proc. IAHS*, 385, 189–196, <https://doi.org/10.5194/piahs-385-189-2024>, 2024.
- Young, G., Demuth, S., Mishra, A., and Cudennec, C.: Hydrological sciences and water security: An overview, *Proc. IAHS*, 366, 1–9, <https://doi.org/10.5194/piahs-366-1-2015>, 2015a.
- Young, G., Cudennec, C., and Savenije, H.: Contribution to the shaping of UNESCO's hydrological programmes, in: Water, people and cooperation – 50 years of water programmes for sustainable development at UNESCO, UNESCO, Paris, 198–199, <https://unesdoc.unesco.org/ark:/48223/pf0000235002> (last access: 27 October 2024), 2015b.
- Zalasiewicz, J., Thomas, J. A., Waters, C. N., Turner, S., and Head, M. J.: The meaning of the Anthropocene: why it matters even without a formal geological definition, *Nature*, 632, 980–984, <https://doi.org/10.1038/d41586-024-02712-y>, 2024.