

**GEWEX Hydroclimatology Panel Report for the GEWEX SSG Meeting  
(Rev2, 29 January 2015)**

**1. Overview**

GEWEX integrates scientific research, production and collection of information in the form of observational data, as well as products derived from applied algorithms and analysis of numerical model solutions, all distributed among different panels. The GEWEX Hydroclimatology Panel (GHP), has been organized around several Regional Hydroclimate Projects (RHPs) and a number of crosscutting science topics. The aim of GHP is especially focused on improving the knowledge about global climate change and its impacts at regional scales and to propagate that knowledge from one region to the other, then, synthesizing the results at the global scale

**2. Objective(s):**

The objectives of GHP are to contribute effectively to the leading role that GEWEX plays in the hydrological sciences and related modeling activities. The GEWEX Science Questions [http://www.gewex.org/pdfs/GEWEX\\_Science\\_Questions\\_final.pdf](http://www.gewex.org/pdfs/GEWEX_Science_Questions_final.pdf) and the related WCRP Grand Challenges <http://www.wcrp-climate.org/grandcha.shtml>, are key to the strategy for implementation of the Panel activities. Discussions on a number of important issues that range from monsoons, to extremes and how to help coordinate the number of national/regional initiatives in those areas, have been fostered by the Co-Chairs. These include collaborations with groups including GDIS, GDAP, GLASS, CLIVAR, CliC and WGRC that have common interests in land-surface processes.

In addition, to keep with the need to be responsive to the WCRP/GEWEX main challenges and scientific questions GHP has organized itself to address the GEWEX science questions from a regional and integrated perspective. The driving premise for this approach is that only at the regional scale can the water cycle be addressed from its physical to human and socioeconomic aspects.

**3. Status: Past year activities [Highlights (status, significant changes, accomplishments)]  
1 - 2 pages**

The leadership role of GHP in the hydrologic sciences and modeling activities within WCRP has been established as has the progress of the GEWEX Regional Hydroclimate Projects (RHPs). GHP continues to be organized around two core activities; namely, all of the Regional Hydroclimate Projects (RHPs), (See Figure 1) and Cross-cutting Sub-projects (see list below).

The RHPs are an essential tool in this endeavor as they bring together various disciplines on the water issues of greatest importance to the advancement of the GSQs.

## GEWEX REGIONAL HYDROCLIMATE PROJECTS

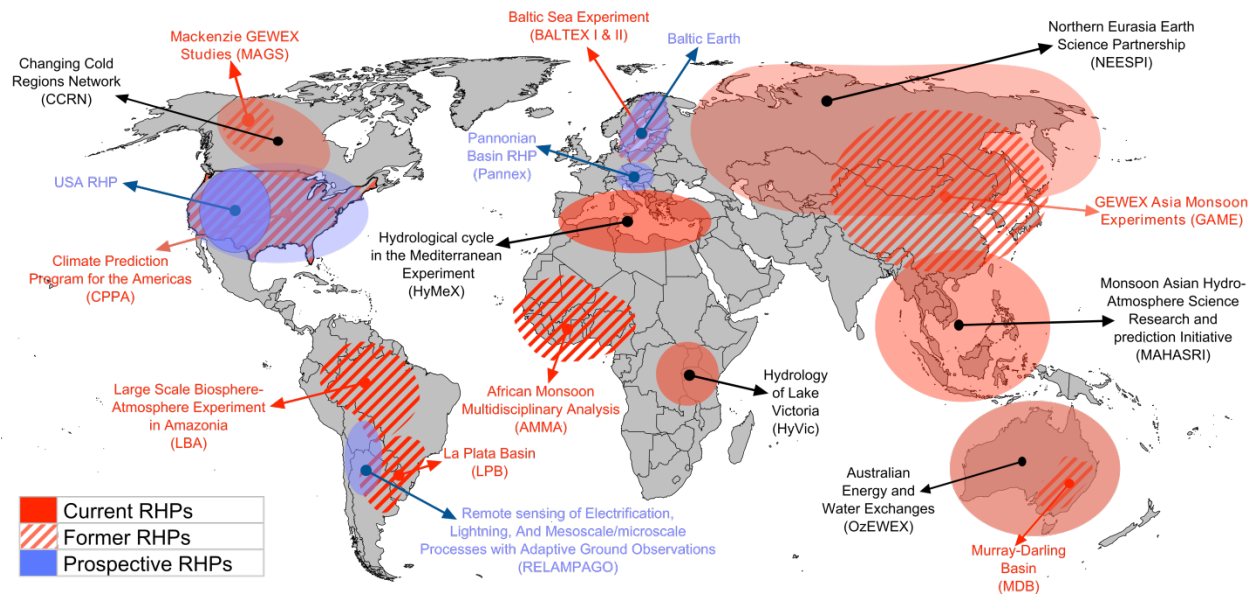


Figure 1: Summary of GHP Regional Hydroclimate Projects (RHP) and related Features

The Cross-Cut projects allow GHP to propagate knowledge from one region to the other and synthesize results at the global scale. They also allow development and testing of applications developed with the new understanding that they deliver both science advances and applicable outcomes for stakeholders and services.

### GHP Cross-Cut Projects List

#### Currently active

- INTENSE (Sub-daily precipitation) (H. Fowler)
- Cold/Shoulder Season Precipitation Near 0°C, (R. Stewart/P. Groisman)
- INARCH (Mountain Hydrology) (J. Pomeroy)
- LSM validation & Benchmarking (M. Ek) – has become a more general attempt to encourage GLASS-GHP collaboration

#### Proposed

- MOUNTerrain (Mountainous Terrain rainfall) (J. Renwick)
- Including water management in large scale models (R. Harding/A. Nazemi)

#### Potential

- Seasonal hydrologic prediction (A. Wood/HEPEX)
- GDAP integrated product regional evaluation

With respect to significant changes over the past year, two regional studies (one in Australia – OzEWEX and the other in Africa-HyVic) that had been developing as prospective RHPs were raised to Initiating RHP status by the Panel. Another important action by the Panel was to consider that the Changing Cold Regions Network (CCRN), 2013-2018, Project, which they were informed of at the GHP September 2013 meeting and which enlarged the scope of

SaskRB, become a new GHP RHP that would have as its domain both the Saskatchewan River Basin (SaskRB) and the Mackenzie River Basin. The Panel made the recommendation, to be carried forward to the SSG for endorsement that CCRN be approved as a RHP replacing SaskRB.

BALTIC-Earth was presented as a prospective RHP that would build on the legacy of a previous RHP in the Baltic Sea region (BALTEX), but the Panel reserved action on this new effort pending more action to clarify issues where the new effort did not meet Initiating RHP Status in accordance with the current criteria for that level of development.

Two other potential RHPs that are developing in South America (RELAMPAGO - Remote sensing of Electrification, Lightning, And Meso-scale/micro-scale Processes with Adaptive Ground Observations) and the other in the Pannonian basin (PannEx) made exceptional progress over the past year. The Panel complimented this work and specified actions that, if followed through upon by the leaders of these studies, would most certainly lead to them becoming Initiating RHPs in due course. The Panel heard a similarly positive presentation/discussion concerning the possibility of developing a proposal that meets the criteria of a GEWEX-style regional effort dealing with water and energy exchanges positioned in USA. The Panel agreed to assist with the scoping of this initiative.

Two existing RHPs, one covering Eurasia (Northern Eurasia Earth Science Partnership Initiative -NEESPI) and the other in Asia (Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative-MAHASRI) were confirmed to be ending in 2015 and 2016 respectively. NEESPI is promoting a follow-on effort designated "Northern Eurasia's Future" Initiative (NEFI) that will be presented to the Panel in 2015. MAHASRI also expects to present a follow-on initiative within the next 2 year period.

For the crosscutting Sub-projects:

(i) "INTElligent use of climate models for adaptation to non-Stationary hydrological Extremes" (INTENSE), led by Dr Hayley Fowler has evolved into a funded European Research Council project. This provides the funded core of a community effort looking into the collection and analysis of sub-daily precipitation data and model outputs with a number of international project partners as a contribution to GHP.

(ii) The Panel recommended that the Cold/Shoulder Season Precipitation Near 0°C effort led by Dr R. Stewart and P. Groisman, and the International Network for Alpine Research Catchment Hydrology (INARCH) (Crosscut) Study led by Dr. J. Pomeroy be accepted as a formal GHP CCs.

(iii) The Panel recommended that each of the MOUNTerrain (Mountainous Terrain rainfall) crosscut science proposal presented by Dr J. Renwick, through a Skype connection, the "Including water management in large scale models" concept presented by Drs R. Harding/H. Wheeler (with A. Nazemi) be encouraged to develop further and that their progress toward formal acceptance as a GHP CCs be reviewed again at the 2015 meeting.

(iv) The Panel agreed that seasonal streamflow forecasting could be an important research focus at which GHP and the Hydrological Ensemble Prediction Experiment (HEPEX) could have a mutually beneficial connection. They, therefore, asked Dr A. Wood to write a proposal using the GHP CC Template that reflects the elements of a Seasonal hydrologic prediction CC that could link the HEPEX and GHP communities.

(v) The GDAP integrated product regional evaluation initiative was undertaken by GHP to interact with GDAP on higher priority science issues such as validation of the precipitation product over mountainous areas. In this context the Panel asked the Co-Chairs to contact the new Chair of GDAP, Dr Joerg Schulz to gauge further interest in the two Panels working together on science research topics that can advance progress on the GSQs by applying GHP CCs and RHP resources that can benefit from linking with GDAP datasets and related assets.

(vi) The Panel noted that the LSM validation & Benchmarking effort had evolved into a more general attempt to encourage Inter-Panel linkages, the collaboration has been undertaken by Dr Ek, on behalf of GHP, through the GEWEX Global Land/Atmosphere System Study (GLASS) Panel. Having identified this effort as an inter-Panel coordination function the Panel decided that it will not be carried forward as a GHP CC but will remain an important part of GHP.

#### **4. New directions (longer term vision): 1 page**

Part of what is driving the GHP vision of its future directions was expressed at the meeting to be the realization that water, had become perhaps the most pressing concern of governments around the world and that these authorities were turning to the science community to assist in the extreme challenges for the sustainable management of water resources at all levels from the local to the global scale. The World Climate Research Programme's (WCRP) Water Availability Grand Challenge, which GEWEX is leading and to which GHP is contributing with support from other WCRP core projects, including CliC and CLIVAR has been launched to help the broader climate science community in its attempt to understand and predict changes to the planet's water cycle.

GHP is trying to orient its efforts to focus on issues that had come up at the recent climate symposium in Darmstadt, Germany, that specified that modelling the important aspects of the water cycle will require ever higher resolution schemes. GHP notes that this matter can be integrated into its longer term vision. This decision was reinforced in the recent GEWEX newsletter article by the GEWEX SSG Co-Chair, Dr Graeme Stephens. GHP is planning to be at the center of the GEWEX effort to continue and expand on its real coordinated initiative that focuses on the terrestrial water cycle. In a practical sense the Panel recognized that throughout the International community and recently in the USA new resources are being applied to the planning and implementation of high resolution experiments motivated in part by the issues raised within the Panel and across the entire WCRP/GEWEX framework.

As also noted recently by the GEWEX SSG Co-Chairs, by contributing to this work, GHP will align plans with these efforts that are being designed to be responsive to the needs of the population to know and understand the answers to the most basic questions surrounding climate change including for example: what levels of climate change could be dangerous, where and for whom? What climate variations and changes may be expected to occur, where, and with what implications? Can society be made more resilient and better prepared for hazardous weather and climate extremes arising from climate variability and change?, and What if anything can be done to mitigate and adapt to climate change to avoid its worst impacts? These questions are regional in nature and thus are addressed within the RHPs.

GHP's deliberations and future plans, are being designed to shed light on our strategy to make progress on the two main themes of the Water Availability Grand Challenge namely, (1) Predicting Changes to Precipitation as Climate Changes e.g. what sets the spatial pattern of precipitation change? (wet wetter, dry drier?) and what determines the regional changes to precipitation intensity (e.g. land surface feedbacks?) and (2) Human Influences on Water Availability and Water Security (e.g. land use changes, land management change, climate change,...).

#### **5. Future: Next year foreseen activities: 1 page**

In the next year GHP will confirm the location and timing of the next full GHP Business meeting currently being considered to be held in Arusha, Tanzania or Taiwan.

For the RHPs, the Panel will take the following actions in 2015:

- (i) ensure progress is made in the implementation of two regional studies (one in Australia – OzEWEX and the other in Africa-HyVic) that were raised to Initiating RHP status by the Panel this year.
- (ii) Evaluate the effectiveness of the decision to enlarge the scope of SaskRB to include both the Saskatchewan River Basin (SaskRB) and the Mackenzie River Basin and to re-designate the entire effort to be the Changing Cold Regions Network (CCRN), 2013-2018, Project.
- (iii) Communicate directly with the Baltic Earth Science Steering Group (BESSG) that had been installed as of June 2014, in an attempt to ensure that the Baltic Earth Science Plan, that is being finalized by March 2015, includes the components that would allow it to be more consistent with meeting the criteria to be designated as a new/Initiating RHP.
- (iv) Request progress reports on the three potential RHPs that are developing in different parts of the globe, namely, South America (RELAMPAGO), the Pannonian basin (PannEx), and the USA (UWEX-working acronym).
- (v) Confirm that the plans for NEESPI and MAHASRI to conclude in 2015 and 2016 respectively include synthesis reports showing the contribution these studies have made to the GSQs.

The Panel will take the following actions in the coming year for the crosscutting Sub-projects:

- (i) Ask Dr Hayley Fowler to summarize progress on INTENSE CC.
- (ii) Assess progress on the newly designated Cold/Shoulder Season Precipitation Near 0°C effort and the International Network for Alpine Research Catchment Hydrology (INARCH).
- (iii) Ensure that the MOUNTerrain (Mountainous Terrain rainfall) crosscut, the “Including water management in large scale models” concept, make progress toward formal acceptance as a GHP CCs.
- (iv) Reevaluate the possibility of GHP and the Hydrological Ensemble Prediction Experiment (HEPEX) coordinating on a Seasonal hydrologic prediction CC that could benefit the HEPEX and GHP communities.
- (v) meet with the new Chair of GDAP, Dr Joerg Schulz to gauge further interest in the two Panels working together on science research topics that can advance progress on the GSQs by applying GHP CCs and RHP resources that can benefit from linking with GDAP datasets and related assets.

## **6. Key results (*bullets*):**

- (i) In matters related specifically to GEWEX, INTENSE is contributing to the GSQ1, 3 & 4 with main inputs to GSQ1 and 3. INTENSE is already contributing to an improved understanding of sub-daily rainfall extremes and their changes globally and how these are simulated by high and very high resolution climate models and projected to change. Additionally,
- (ii) for GSQ4, energy and water cycle process studies are dependent on good quality datasets and INTENSE is beginning to provide the required datasets for sub-daily precipitation.
- (iii) INTENSE has also provided information on improvements gained from running very high resolution climate models in different regions.
- (iv) The Cold/Shoulder Season Precipitation CC has begun to contribute to improved understanding of future changes in hazardous cold/shoulder season precipitation and storms, especially occurring near 0°C that have been shown to be devastating to a number of societal activities and, which are sensitive to changing climate uncertainties. A review article for BAMS is in work that will articulate other accomplishments within the framework of this GHP CC.
- (v) The International Network for Alpine Research Catchment Hydrology (INARCH) (Crosscut) Study has shown that some alpine catchments are contributing to higher frequency of floods and/or droughts. Work has also been accomplished in the evaluation of different downscaling schemes from meteorological to hydrological models in mountains.

(vi) Work was started on a crosscut proposal to improve seasonal climate and hydrologic predictability by exploiting the state-of-the-art datasets and models in the GEWEX RHP's and the improved understanding of how well methods across the statistical-dynamical spectrum harness local-to-regional scale hydrometeorological predictability for a basin collection determined from water resources considerations as HEPEX has promoted.

A large number of specific key results have come out of the work being carried out at the regional scales in each of the RHPs and these can be found in the presentations that have been staged at: <http://www.gewexevents.org/ghp-agenda/>.

## **7. Issues for attention by the SSG:**

The Panel made several recommendations that they felt would be of interest to the SSG and where endorsement of the SSG would lend weight to the action of the Panel. These included:

(i) The Panel was advised that the Changing Cold Regions Network (CCRN), 2013-2018, Project which they were informed of at the GHP September 2013 meeting and which enlarged the scope of SaskRB, was being formally proposed as a new RHP that would have as its domain both the Saskatchewan River Basin (SaskRB) and the Mackenzie River Basin. The Panel made the following Recommendation (R-1) to be carried forward to the SSG for endorsement, namely, that CCRN be accepted as a RHP replacing SaskRB.

(ii) Since the meeting at The Hague, Drs Polcher and Evans had worked with Dr Semazzi to upgrade the documentation and provide guidance necessary for HyVic to meet the RHP criteria for Initiating status. The outcome was that the Panel made the following Recommendation (R-2) to be carried forward to the SSG for endorsement, namely that HyVic be accepted as a new/Initiating RHP with the stipulation that IGPO assist HyVic to establish a Web Page and that Semazzi advance the case for a local drought monitoring system and additional capacity building within the HyVic Framework.

(iii) The Panel heard that the outcome of the OzEWEX 1st Annual OzEWEX Workshop 28–29 October 2014 Canberra, Australia (Reference Summary in GEWEX Newsletter, Vol. 24 No. 4, November 2014), as reported by Dr Albert van Dijk, included agreements on a set of amalgamating themes that were oriented toward meeting the criteria of an Initiating RHP. The Panel concluded that these outcomes had strengthened the OxEWEX concept and that there is a sufficient number of investigations into a broad range of issues that need to be worked on and that relate directly to the WCRP GCs and GEWEX GSQs to warrant the Recommendation (R-3), to be carried forward to the SSG for endorsement, that OzEWEX be accepted as an Initiating GHP RHP.

(iv) The SSG should be aware that the Panel was asked by the GEWEX SSG Co-Chairs (Stephens/Seneviratne) to help with a scoping exercise for a GEWEX–style regional effort positioned in USA, by developing a proposal that meets the GHP criteria for such studies. To

begin this exercise the Panel appointed a planning committee made up of the following members: F. Dominguez (U. Arizona), R. Rasmussen (NCAR), A. Barros (Duke Uni.), Tom Painter (JPL) and Levi Brekke (Bureau of Reclamation) to immediately begin the task of preparing a draft whitepaper that specifies the main science issues to be addressed by such a study along with the region(s) of interest, the tools and funding sources/opportunities, the main stakeholders/applications, social issues to be considered, links with other groups/studies (both national and International), outreach opportunities, etc. The SSG may want to comment on the suggestions the Panel made to help start the work of the planning Committee on a USA RHP, namely that:

- Time scales should go from weather to climate
- The project should be centered on application driven researchers
- The region of choice could be the Colorado basin within the Wester US Climatic region.
- The whitepaper, once completed, should be publicized in an article in the GEWEX Newsletter.

(v) The Panel acknowledged that the proposal for a Cold/Shoulder Season Precipitation crosscut project by Drs Groisman/Stewart had merit in that this phenomenon is of interest/importance to the GHP/GEWEX climate research agenda. Drs Stewart and Groisman were asked to follow through on the plan to prepare a review article for BAMS that would articulate more clearly what is needed and what will be accomplished within the framework of a GHP CC, especially what the results (deliverables) will be in the next 2-3 year period and how they will advance progress on addressing the GSQs. The Panel recommendation (R-4), to be carried forward to the GEWEX SSG for endorsement, was that the Cold/Shoulder Season Precipitation Near 0°C effort be accepted as a formal GHP CC.

(vi) The Panel acknowledge the extent of the maturity of the International Network for Alpine Research Catchment Hydrology (INARCH) (Crosscut) Study specifically the level of International involvement in the list of Co-proposers, and the significance of issues surrounding mountain hydrology. On this basis and the fact that funding has been sought and is being committed to some aspects of the work the Panel agreed to: The Panel recommendation (R-7), to be carried forward to the GEWEX SSG for endorsement, is to accept INARCH as a formal GHP CC.

(vii) Three new panel members are needed due to current member terms ending. One of these is the GLASS representative to be nominated by GLASS (replacing Mike Ek). The other two leaving members are from the USA and the UK. Options for suitable replacements are being sought.

## **8. Contributions to WCRP Strategic Themes/Grand Challenges (preferably with indication towards GEWEX Science Questions):**

The Co-Chairs have developed an outline of plans for further study and implementation over the next 2-3 year period. Decisions have been made concerning the priority of each element in the



context of the contribution GHP must make to the GEWEX Science Questions that have been derived from the WCRP Grand Challenges. These decisions are at the center of the GHP strategy for implementation of its activities. Discussions on a number of important issues that range from monsoons, to extremes and how to help coordinate the number of national/regional initiatives in those areas, have been fostered by the Co-Chairs. This process has allowed the Co-Chairs to make recommendations to the SSG about consolidating GHP work and redirecting priorities to be more in line with the current phase of GEWEX. Each RHP and crosscutting science element in GHP will continue to focus on issues that contribute to the Grand Challenges and the GSQs. In specific it is felt that several of the GHP RHPs and crosscuts include elements of each GC/GSQ and, therefore, that they represent a good approach for GHP to show progress on work related to the GSQs. This framework is exhibited in Figure 2.

## GHP activities in relation to GSQs

GEWEX Science Questions		Regional Hydroclimate Projects						Cross-cut activities
		MAHASRI	NEESPI	HyMeX	CCRN	HyVic	OzEWEX	
Observations and Predictions of Precipitation	How well can precipitation be described?	y	y	y	y	y	y	Precipitation near 0°C
	How do changes in climate affect the characteristics?	y	y	y	y	y	y	Mountain precipitation
	How much confidence do we have in predictions?	y		y			y	Sub-daily precipitation INTENSE
Global Water Resource Systems	How do changes in the land surface and hydrology influence water resources?	y	y	y	y	y	y	Mountain hydrology INARCH
	How does climate change impact water resource systems?	y	y	y	y		y	Water management in land-surface models
	How can new observations lead to improved management?	y			y		y	Drought
Changes in extremes	Observing system requirements	y	y	y	y		y	Seasonal Hydrologic prediction
	Modelling capabilities			y	y	y	y	
	Modelling processes involved in extremes			y	y	y	y	
	Improved early warning systems	y			y	y		
Water and energy cycles	Can we balance the budget at TOA?							GDAP integrated product evaluation
	Can we balance the budgets at the surface?			y			y	
	Can we track the changes over time?			y			y	
	Can we relate changes and processes?							
	Cloud-aerosol-precipitation feedbacks							

Figure 2: Cross-cut Science/RHP Contribution to GEWEX Science Questions Summary Matrix

### 9. Summary: 10-15 lines (should be directly usable for GEWEX report)

GHP efforts have recently been aligned with the deliberate planning process in WCRP and GEWEX that has evolved around determining the highest priority issues in climate research and articulating those in the form of a number of WCRP Grand Challenges and the GEWEX Science Questions. As a consequence GHP has become an essential element in GEWEX's strategy to

answer key questions on the energy and water cycle. The strategy GHP is employing to address first GEWEX's scientific questions and consequently to contribute to the WCRP Grand Challenges is through regional hydroclimatology projects (RHPs) and crosscut science activities. The regional focus of GHP has the added value of enabling the GHP community to include and reach out to application driven efforts and groups and to transform our knowledge into action oriented information. The vision of the future for GHP is to maintain the momentum it has built up through its current organizational structure and to link with the other GEWEX Panels and core projects and working groups including GDAP, GLASS, CLIVAR, CliC, SPARC, GDIS, WGRC and other related global environmental change (GEC) research programs, such as the Future Earth initiative, to find opportunities for building new RHPs and Crosscutting science initiatives that will allow the Panel to meet its commitments not just to better understand the regional issues but to contribute to the goals of WCRP and GEWEX at all scales.

## 10. List of key publications

There has been a large number of publications that have resulted from work in studies that are part of GHP, especially the RHPs. As a way of indicating the scope of these publications a sample list is shown below from three of the active RHPs, including HyMeX, MAHASRI, and NEESPI. For further details a link is provided to the reports <http://www.gewexevents.org/ghp-agenda/> where more extensive publication lists are available.

HyMeX: *Publications*: [www.hymex.org/?page=publications/](http://www.hymex.org/?page=publications/)  
*191 peer reviewed articles*

Publications describing HyMeX and its components:

Programme :

Drobinski, et al, 2014:HyMeX, a 10-year multidisciplinary program on the Mediterranean water cycle. *Bulletin of the American Meteorological Society*, 95, 1063-1082.

SOP1 :

Ducrocq, et al, 2014: HyMeX-SOP1, the field campaign dedicated to heavy precipitation and flash flooding in the northwestern Mediterranean, *Bulletin of the American Meteorological Society*, 95, 1083-1100.

Bousquet, et al., 2014: Multiple-frequency radar observations collected in southern France during the field phase of the hydrometeorological cycle in the Mediterranean experiment (HyMeX), *Bulletin of the American Meteorological Society*, sous presse.

Defer et al, 2014 : An overview of the lightning and atmospheric electricity observations collected in Southern France during the HYdrological cycle in Mediterranean EXperiment (HyMeX), Special Observation Period 1, *Atmospheric Measurement Techniques* (en révision)

Davolio, et al, 2014: The role of the Italian scientific community in the first HyMeX SOP: an outstanding multidisciplinary experience. *Met. Zeit.*, sous presse

Ferretti, et al, 2014:Overview of the first HyMeX Special Observation Period over Italy: observations and model results. *Hydrology and Earth System Sciences*, 18, 1953-1977.

Jansà, et al, 2014: Heavy rain and strong wind events over Spain during HyMeX SOP1. *Thetys, Revista de meteorologia i climatologia mediterrània*, 11, 25-38.

SOP2 :

Estournel, C., et al, 2014: HyMeX-SOP2, the field campaign dedicated to dense water formation in the north-western Mediterranean, *Oceanography*. (en révision)

EOP :

Braud, et al, 2014: Multi-scale hydrometeorological observation and modelling for flash-flood understanding. *Hydrology and Earth System Sciences*, 18, 3733–3761.

MEDCORDEX :

Ruti, et al, 2014: MED-CORDEX initiative for Mediterranean climate studie. *Bulletin of the American Meteorological Society* (en révision)

Coordination of 4 special issues:

Resultats from SOP1 at the Quaterly Journal of the Royal Meteorological Society (*submission deadline: 17 April 2015, ~ 50 expected articles, 2 articles published, contact : V. Ducrocq*)

« Flash floods, hydro-geomorphic response and risk management » at the Journal of Hydrology, (*submission deadline: 30 April 2015, contact : I. Braud*) – EGU2015 session

Regional climate modelling at Climate Dynamics (*submission deadline: June 2015 , 25 expected articles, contact : S. Somot*)

Results from SOP2 at Ocean Sciences (*still in discussion*)

PhD theses: 57

(28 defended, 29 on-going)

MAHASRI: <http://gewex.org/ghp-gdap/docs/MAHASRI.pdf>

Nguyen-Thi, H.A., J. Matsumoto, T. Ngo-Duc, and N. Endo, 2012. A Climatological Study of Tropical Cyclone Rainfall in Vietnam. *SOLA*, 8, 041–044.

Nguyen-Thi, H.A., J. Matsumoto, T. Ngo-Duc, and N. Endo, 2013. Long-term Trends in Tropical Cyclone Rainfall in Vietnam. *Jour. Agrofor. Env. Bangladesh* (in press).

NEESPI: <http://gewex.org/ghp-gdap/docs/NEESPI.pdf>

Publications related to NEESPI activities in 2014 are still being collected. Meanwhile in 2013, 179 peer-reviewed papers, books, and book chapters were published and in 2014, *according to an incomplete account*, 57 were published another 22 are in press or submitted. Their list is presented at [http://neespi.org/science/NEESPI\\_publications.pdf](http://neespi.org/science/NEESPI_publications.pdf). Below we list additionally a brief EOS overview report about the Initiative and a representative subset of publications that characterize research made within the NEESPI community in 2014.

Groisman, P., S. Gulev, and Sh. Maksyutov, 2014: Earth System Studies in Northern Eurasia, *EOS*, **95**, No. 16, 133-135, 22 April 2014.

Kicklighter, D. W., Y. Cai, Q. Zhuang, E. I. Parfenova, S. Paltsev, A. P. Sokolov, J. M. Melillo, J. M. Reilly, N. M. Tchebakova and X. Lu . 2014. Potential influence of climate-induced vegetation shifts on future land use and associated land carbon fluxes in Northern Eurasia. *Environ. Res. Lett*, **9**, 035004,

Kukavskaya E.A., Ivanova G.A., Conard S.G., McRae D.J., Ivanov V.A. 2014: Biomass dynamics of central Siberian Scots pine forests following surface fires of varying severity. *International Journal of Wildland Fire*. **23** (6). 872-886. DOI: 10.1071/WF13043.

Kuemmerle, T., L. Baskin, P. Leitao, A. Prishchepov, K. Thonicke, and V. C. Radeloff. 2014: Potential impact of oil and gas development and climate change on migratory reindeer calving grounds across the Russian Arctic. *Diversity and Distributions*, **20**(4): 416-429

Liu Y., Q. Zhuang, Z. Pan, N. Tchebakova, D.Kicklighter, D.Miralles, J. Chen, A. Sirin, Y. He, J. Melillo. 2014: Responses of evapotranspiration and water availability to the changing climate in Northern Eurasia 2014. *Climatic Change* DOI 10.1007/s10584-014-1234-9

Majorowicz J., Safanda J., Przybylak R., 2014, The Little Ice Age signature and subsequent warming seen in borehole temperature logs versus solar forcing model, *International Journal of Earth Sciences* (Geol Rundsch), 1163-1173, DOI 10.1007/s00531-014-1008-7.

Muskett, R. 2014: MODIS-Derived Nighttime Arctic Land-Surface Temperature Nascent Trends and Non-Stationary Changes. *American Journal of Climate Change*, **3**, 169-177, 2014. doi: 10.4236/ajcc.2014.32016.

## **11. List of Meetings**

Participated at the 7-10 Oct 2013 7th HyMeX Workshop Cassis, France.

Participated at the 15-18 Oct 2013 The Africa Climate Conference 2013 (ACC-2013) Arusha, Tanzania.

Participated at the 28-31 Oct 2013 26th Session of the GEWEX SSG Boulder, Colorado, USA.

Held a side meeting at the 9-12 Dec 2013 Fall American Geophysical Union Meeting San Francisco, CA.

Participate at the 17-21 March 2014 WCRP Conference for Latin America and the Caribbean: Developing, linking and applying climate knowledge, Montevideo, Uruguay.

Participated at the 14-17 July 2014 7th International Scientific Conference on the Global Energy and Water Cycle and the 17-18 July 2014 3rd Pan-GEWEX Meeting both at The Hague, The Netherlands.

Held a GHP side meeting at the 14-17 July 2014 7th International Scientific Conference on the Global Energy and Water Cycle and the 17-18 July 2014 3rd Pan-GEWEX Meeting both at The Hague, The Netherlands.

Held the annual GHP Business meeting December 2014 at Pasadena, CA., USA.

## **12. Planned meetings, workshops**

There has been a large number of meetings planned that are part of GHP, especially the RHPs. As a way of indicating the scope of these meetings/events a sample list is shown below from three of the active RHPs, including HyMeX, MAHASRI, and NEESPI. For further details a link is provided to the reports <http://www.gewexevents.org/ghp-agenda/> where more extensive publication lists are available.

General:

GHP Business meeting currently being considered to be held in Arusha, Tanzania or Taiwan during the 4<sup>th</sup> Quarter of 2015.

MAHASRI: <http://gewex.org/ghp-gdap/docs/MAHASRI.pdf>

March 10-12, 2015: The fourth International Workshop of Climatic Changes and Their Effects on Agriculture in Asian Monsoon Region (GRENE-CAAM Workshop) at Hanoi, Vietnam;

May 24-28, 2015: JpGU International session “Asian monsoon Hydroclimate” at Chiba, Japan;

August 2-7, 2015: AOGS AS session “AMY” at Singapore;

August 2-7, 2015: APHW HS session “Asian monsoon hydroclimate” at Singapore

NEESPI: <http://gewex.org/ghp-gdap/docs/NEESPI.pdf>

December 15-19, 2014, San Francisco, USA. Open NEESPI Session at the Annual Fall AGU Meeting (deadline passed; 41 abstracts submitted)

April 9-12, 2015, Charles University in Prague, Czech Republic, Workshop “Ten years of Northern Eurasia Earth Science Partnership Initiative (NEESPI): Synthesis and Future Plans”

April 13- 19, 2014, Vienna, Austria. Open NEESPI Session at the Annual EGU Assembly

July dates TBD, 2014, Novosibirsk, Russia. CITES Educational Scientific Event and Science Conference

December, 2015, San Francisco, USA. Open NEESPI/NIFI Session at the Annual Fall AGU Meeting.

HyMeX: <http://www.hymex.org/?page=workshops>

9th HyMeX Workshop in Mykonos (Greece) 21 – 25 Sept 2015

Summer schools:

Support and/or participation to: « Water & Society Summer School », May 2015, France

### **13. List of members and their term dates where appropriate (including changes)**

Co-chair - Dr Jan Polcher (4 year appointment 2011-2015 with option for 1 4-year reappointment)

Co-Chair - Dr Jason Evans (4 year appointment 2012-2016 with option for 1 4-year reappointment)

Dr Hugo Berbery, (charter member appointment Self-terminated (18 July 2014); nominal end date February 2015) - Not eligible for reappointment

Dr Mike Ek, (charter member appointment extended up to February 2015) – not eligible for reappointment

Dr Richard Harding, (charter member appointment extended up to February 2015) - not eligible for reappointment

Dr. Li Yaohui, (3 year appointment February 2013/16 with option for one 3 yr. reappointment)

Prof. Kei Yoshimura (3 year appointment February 2013/16 with option for one 3 yr reappointment)

Prof. Joan Cuxart Rodamilans (3 year appointment February 2014/17 with option for one 3 yr reappointment)

Dr. Silvina Solman (3 year appointment February 2014/17 with option for one 3 yr reappointment)

Dr. Nicole Van Lipzig (3 year appointment February 2014/17 with option for one 3 yr reappointment)

Prof. Hamma Yacouba (3 year appointment February 2014/17 with option for one 3 yr reappointment)

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