



NATIONAL SCIENCE FOUNDATION
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ARLINGTON, VIRGINIA 22230

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Dear Colleague Letter: Hydrologic Sciences and Physical and Dynamic Meteorology Cooperation

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Dear Colleagues:

The National Science Foundation's Directorate for Geosciences supports research programs in both [Hydrologic Sciences \(HS\)](#) and [Physical and Dynamic Meteorology \(PDM\)](#). These programs share a common interest in (1) the fluxes of water, mass and energy across the terrestrial-atmospheric boundary, (2) how such fluxes are measured and (3) how such fluxes are parameterized within large and small scale models. A host of research reports have identified multiple ways in which the terrestrial and atmospheric systems are coupled (Duffy et al., 2006; IPCC, 2013; NRC, 2012a, 2012b; Ralph et al., 2012; Smith et al., 2013) and there is growing recognition of the importance of these couplings, interactions, and their interdependencies for both scientific research and operational prediction.

To encourage interactions between the Hydrologic Science and Physical and Dynamic Meteorology research communities in advancing this critical research, a community workshop was held 3-5 September, 2014 in Golden, Colorado. The purpose of this workshop was to motivate and accelerate progress on hydrometeorological-hydroclimatic-ecohydrological process understanding across the terrestrial-atmospheric boundary, and especially the integration of common research interests of hydrology and meteorology. The results of the meeting are reported in a white paper that can be accessed using: <http://www.nsf.gov/geo/ear/programs/nsf-hydro-atmos-workshop-whitepaper-dec2014.pdf> or <http://inside.mines.edu/~thogue/nsf-hydro-atmo-workshop/>.

One goal of the workshop was to outline high-level, cross-discipline research needs common to both Hydrologic Sciences and Physical and Dynamic Meteorology to define areas of collaborative research between those two research communities. Another goal of the workshop was to redefine current disciplinary barriers such that the "boundary conditions" of individual disciplines evolve towards a more holistic process understanding and predictive skill. This white paper provides detailed statements of the core challenges in the 'observational' and 'modeling' categories, as the 'scientific challenges' clearly cross-cut in both categories. Each "challenge" section has an overarching component and a set of high-level sub-components.

Within this context, innovative proposals that specifically address challenges existing at the atmospheric-terrestrial boundary, including challenges in process understanding, measurement and modeling can be sent to either program. Topical areas are suggested in the above referenced white paper, however this document does not define all possible research areas across this boundary. Proposals in this area of research will be co-reviewed by both programs and will be supported from existing programmatic funds. Proposals are accepted at any time in both the PDM and HS programs. If you have a research topic that you think would be of interest, please contact the program officers in either group.

Points of contact for participating programs:

Thomas Torgersen
Program Officer; Division of Earth Sciences,
Hydrologic Sciences program

Chungu Lu
Program Officer; Division of Atmospheric and Geospace Sciences,
Physical and Dynamic Meteorology program

Sincerely,

Roger Wakimoto
Assistant Director
Directorate for Geosciences

References

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Ralph, M., *et al.*, 2012: "Understanding the Water Cycle" - Final Report Issued from NOAA's Water Cycle Science Challenge Workshop. Available online at: <http://hmt.noaa.gov/news/2012/112812.html>.

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