

- Lombard, P. J.: Flood of April 2007 in southern Maine: US Geological Survey Scientific Investigations Report 2009–5102, 34 p., available at: <http://pubs.usgs.gov/sir/2009/5102> (last access: 12 November 2015), 2009.
- Luo, L. and Wood, E. F.: Monitoring and predicting the 2007 US drought, *Geophys. Res. Lett.*, 34, L22702, doi:10.1029/2007GL031673, 2007.
- Morrison, A. M.: Receiver operating characteristic (ROC) curve analysis of antecedent rainfall and the alewife/mystic river receiving waters, Boston, Massachusetts Water Resources Authority, Report ENQUAD 2005–23, 26 pp., 2005.
- Murphy, A. and Winkler, R.: A general framework for forecast verification, *Mon. Weather Rev.*, 115, 7, 1330–1338, 1987.
- Proud, S. R., Fensholt, R., Rasmussen, L. V., and Sandholt, I.: Rapid response flood detection using the MSG geostationary satellite, *Int. J. Appl. Earth Obs.*, 13, 536–544, 2011.
- Ramillien, G., Cazenave, A., and Brunau, O.: Global time variations of hydrological signals from GRACE satellite gravimetry, *Geophys. J. Int.*, 158, 813–826, doi:10.1111/j.1365-246X.2004.02328.x, 2004.
- Reager, J. T. and Famiglietti, J. S.: Global terrestrial water storage capacity and flood potential using GRACE, *Geophys. Res. Lett.*, 36, L23402, doi:10.1029/2009GL040826, 2009.
- Reager, J. T. and Famiglietti, J. S.: Characteristic mega-basin water storage behavior using GRACE, *Water Resour. Res.*, 49, 3314–3329, doi:10.1002/wrcr.20264, 2013.
- Scawthorn, C.: Modeling flood events in the US, *Proceedings of EuroConference on Global Change and Catastrophe Risk Management*, p. 7, IIASA, Laxenburg, Austria, 6–9 June, 1999.
- Schmidt, R., Schwintzer, P., Flechtner, F., Reigber, Ch., Güntner, A., Döll, P., Ramillien, G., Cazenave, A., Petrovic, S., Jochmann, H., and Wunsch, J.: GRACE observations of changes in continental water storage, *Global and Planet. Change*, 50, 112–126, doi:10.1016/j.gloplacha.2004.11.018, 2006.
- Stephenson, D. B.: Use of the odds ratio for diagnosing forecast skill, *Weather Forecast.*, 15, 221–232, 2000.
- Tariq, M. A. U. R.: Risk-based planning and optimization of flood management measures in developing countries: Case Pakistan, PhD thesis, VSSD, TU Delft, Delft University of Technology, 2011.
- Trenberth, K. E.: Changes in precipitation with climate change, *Clim. Res.* 47, 123–138, 2010.

6987

- Wang, Q., Watanabe, M., Hayashi, S., and Murakami, S.: Using NOAA AVHRR data to assess flood damage in China, *Environ. Monit. Assess.*, 82, 119–148, 2003.
- Xie, P. and Arkin, P. A.: Global precipitation: a 17 year monthly analysis based on gauge observations, satellite estimates, and numerical model outputs, *B. Am. Meteorol. Soc.*, 78, 2539–2558, 1997.
- Yeh, P. J-F., Swenson, S. C., Famiglietti, J. S., and Rodell, M.: Remote sensing of groundwater storage changes in Illinois using the Gravity Recovery and Climate Experiment (GRACE), *Water Resour. Res.*, 42, W12203, doi:10.1029/2006WR005374, 2006.

6988

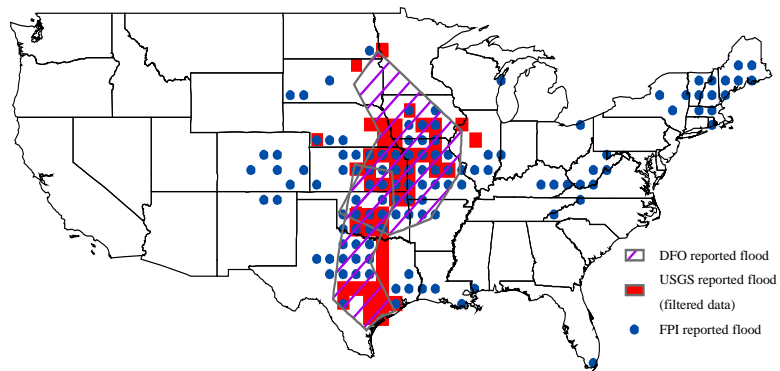


Figure 2. May 2007 with DFO reported flood, USGS reported flood (filtered data) and RFP reported flood ($\tau = 0$).

6991

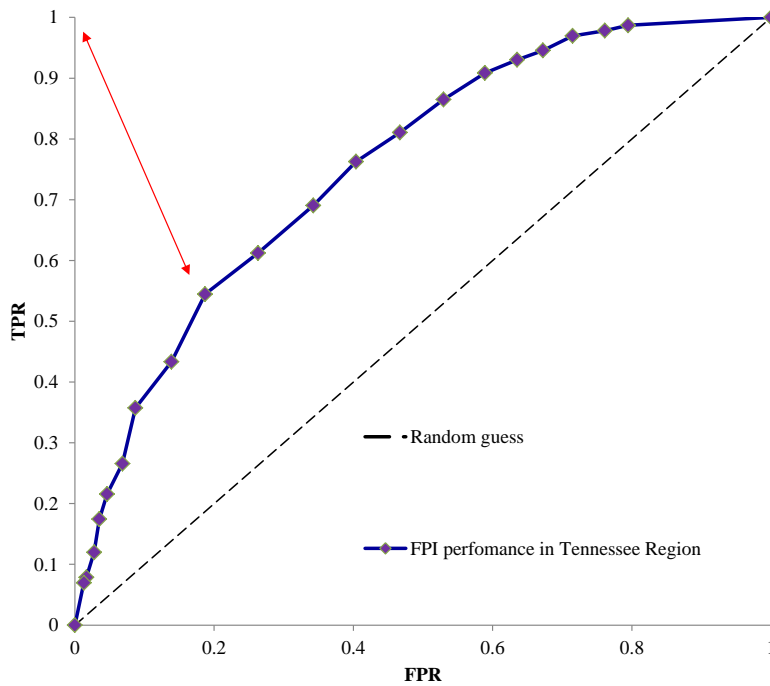


Figure 3. Sample ROC curve for the Tennessee watershed (purple). The markers represent different RFP thresholds. The optimal value of the classifier threshold τ for this watershed is -0.1 . The optimal threshold value must correspond to the point on the ROC curve, which is the closest to the (0, 1) point. The random guess line (black dashed line) follows the diagonal of the plot and has an AUC of 0.5.

6992

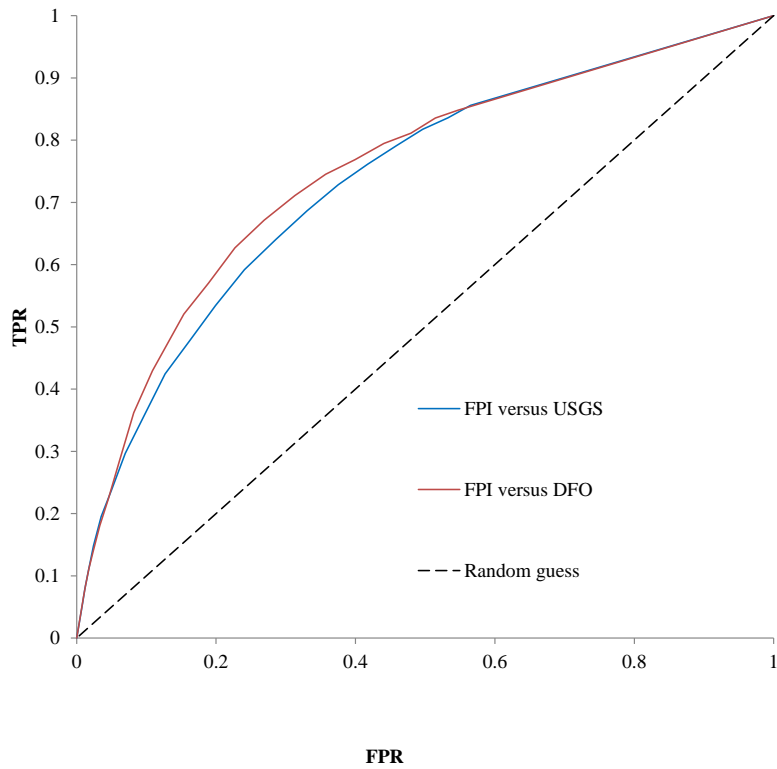


Figure 4. ROC curves for the comparison between the RFPI and the USGS- and DFO-reported floods.

6993

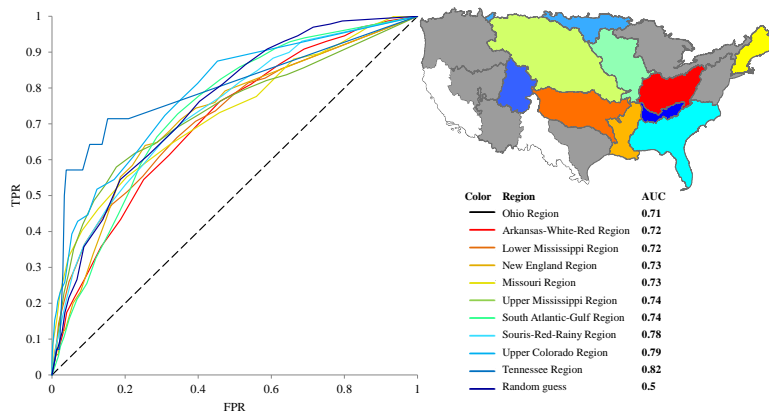


Figure 5. Evaluating RFPI predictive skills in major watersheds using USGS-reported floods ($X > 0.5$). **(a)** The ROC curves for each watershed and the corresponding RFPI AUC values. **(b)** Delineation of major watersheds. Rio Grande and California watersheds (in white) were excluded due to low number of floods. The watersheds that have RFPI AUC values less than 0.7 are in grey color (Lower Colorado, Texas-Gulf, Great Basin, Great Lakes, Mid Atlantic and Pacific Northwest).

6994

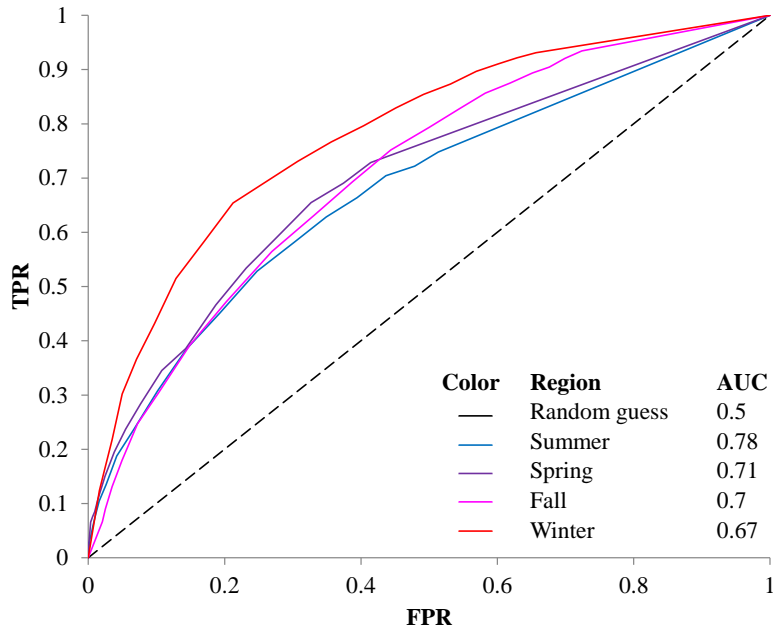


Figure 6. A comparison between the RFPI and the USGS-reported floods in the Mississippi river basin by the season.

6995

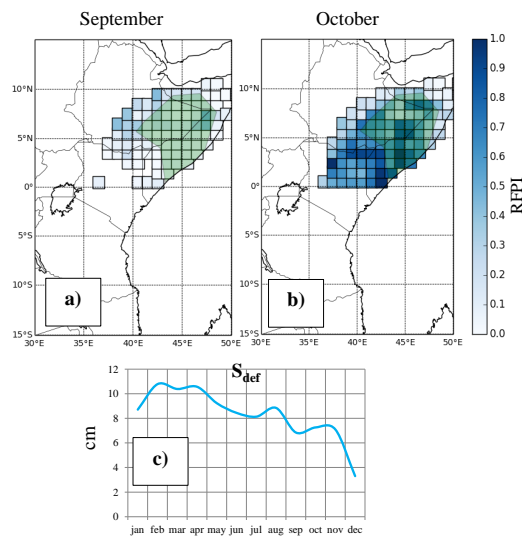


Figure 7. The 2006 flood in the Juba–Shabelle river basin **(a)** Grid cells with positive RFPI values in September, one month before the flooding, overlapped with the DFO flood polygon. **(b)** Grid cells with positive RFPI values in October, the flood month, overlapped with the DFO flood **(c)**. The storage deficit time series for the Juba-Shebelle watershed.

6996