Supplementary material for Paper 2007GL032487

The use of a standardized runoff index for characterizing hydrologic drought

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This document contains supplementary material submitted in association with the above-captioned article, which references the three figures detailed below.

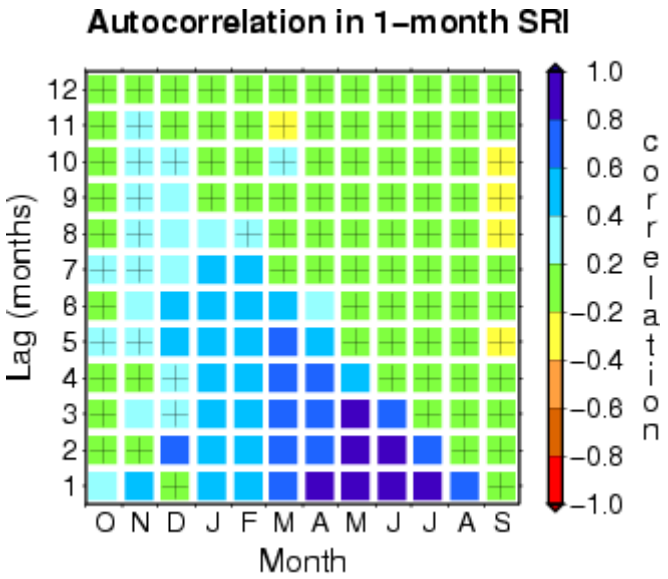

Figure S1 Autocorrelation of the SRI for the Feather River basin at 1 to 12 month lags starting in each month of the year, based on index values from 1950-2004. Values not found to be statistically different from zero at p=0.90 (two tailed test) are plotted with a (+) symbol. The effect of the snow accumulation and melt cycle and soil moisture storage in persisting hydrologic anomalies is evident in the significant correlations found from January through August. To determine significance (from a single test standpoint), a Fisher's z transformation was used to map the Pearson correlations to a normally distributed space, and a confidence interval centering on zero correlation was constructed. The bounds of this interval are approximately +/- 0.28. For the SPI (not plotted), only a few correlations for different combinations of start month and lag were close to the significance boundary. Given the repetition of the test (12 start months by 12 lags), however, no SPI correlations were deemed significant.

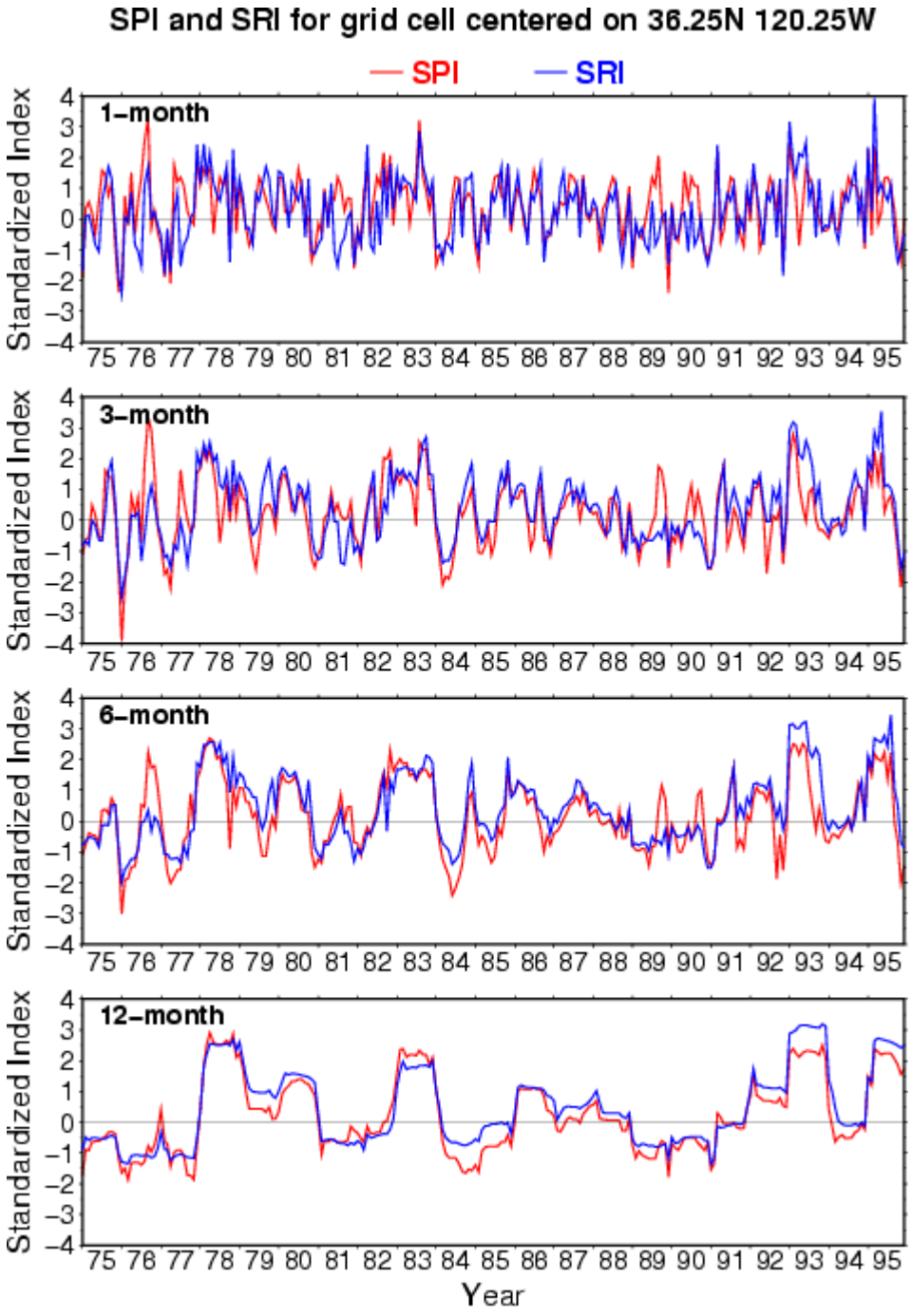

Figure S2 Historical time series of the SPI and SRI for 1-, 3-, 6- and 12-month accumulation periods based on observed gridded precipitation and simulated runoff for a ½ degree model grid cell (latitude 36.25 degrees N, 120.25 degrees W) in southern California, USA. The shorter duration indices show greater temporal correspondence than those for the Feature River basin,

where the snow accumulation and melt process creates a lag in spring and summer between precipitation and runoff.

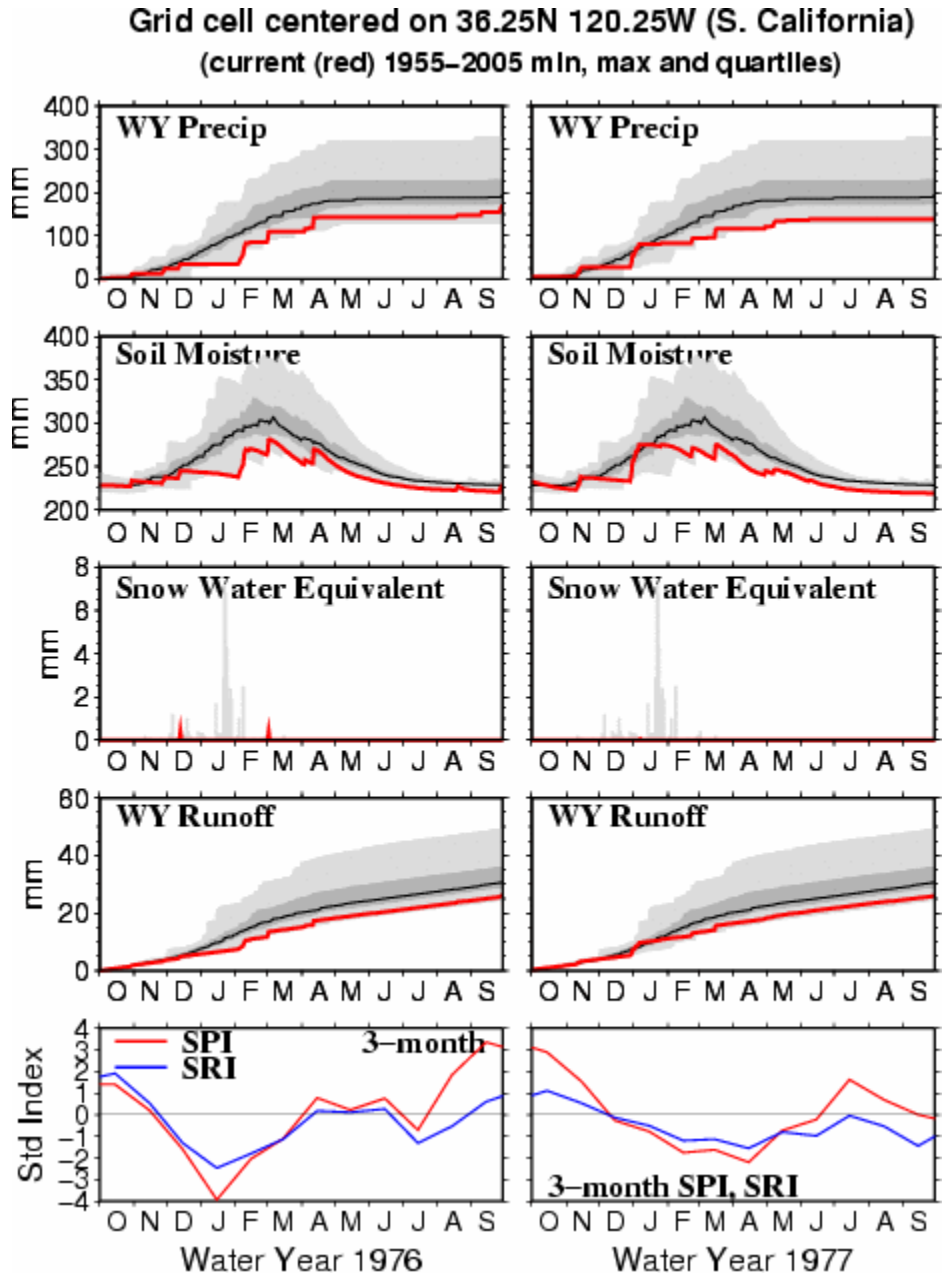

Figure S3 The water balance of a ½ degree model grid cell (latitude 36.25 degrees N, 120.25 degrees W) in southern California, USA. during two water years (1976 left; 1977 right) compared with the 3-month SPI and SRI. Daily values of observed precipitation and simulated soil moisture, snow water equivalent and runoff in each of the two years (red line) are plotted against the minimum, maximum and quartiles of their daily historical distribution from 1955-

2005. The SPI and SRI have a monthly timestep. Precipitation arriving at times of low soil moisture creates an elevated SPI, but has a diminished effect in raising the SRI. The lack of snow in this area means that the primary lags and attenuation between SPI and SRI are due to soil moisture recharge and discharge effects.