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Is the Pearl River basin, China, drying or wetting? Seasonal variations, causes and implications

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Abstract: Soil moisture plays crucial roles in the hydrological cycle and is also a critical link between land surface and atmosphere. The Pearl River basin (PRb) is climatically subtropical and tropical and is highly sensitive to climate changes. In this study, seasonal soil moisture changes across the PRb were analyzed using the Variable Infiltration Capacity (VIC) model forced by the gridded $0.5^o \times 0.5^o$ climatic observations. Seasonal changes of soil moisture in both space and time were investigated using the Mann-Kendall trend test method. Potential influencing factors behind seasonal soil moisture changes such as precipitation and temperature were identified using the Maximum Covariance Analysis (MCA) technique. The results indicated that: (1) VIC model performs well in describing changing properties of soil moisture across the PRb; (2) Distinctly different seasonal features of soil moisture can be observed. Soil moisture in spring decreased from east to west parts of the PRb. In summer however, soil