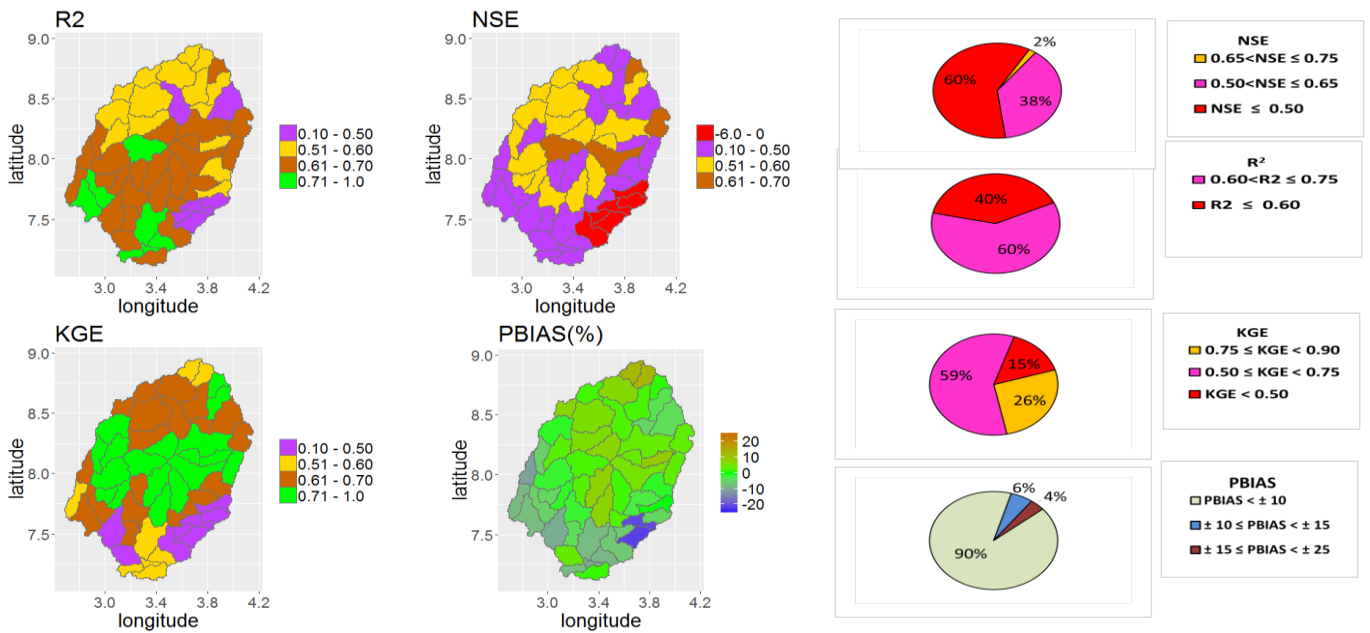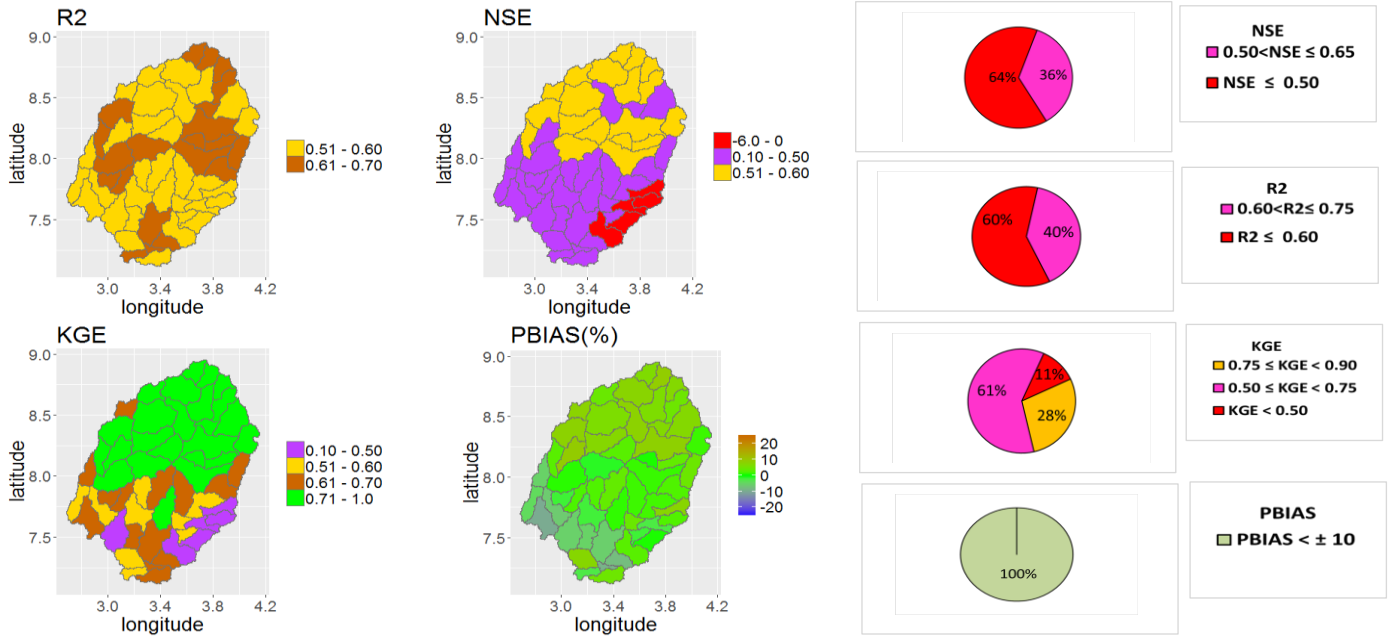**Figure S1: Performance metrics (NSE, KGE, R^2, and PBIAS) of SWAT (SWAT_P-T) when calibrated with GLEAM_v3.0a (GS2).**

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Figure S2: Performance metrics (NSE, KGE, R^2, and PBIAS) of SWAT (SWAT_P-T) when validated with GLEAM_v3.0a (GS2).

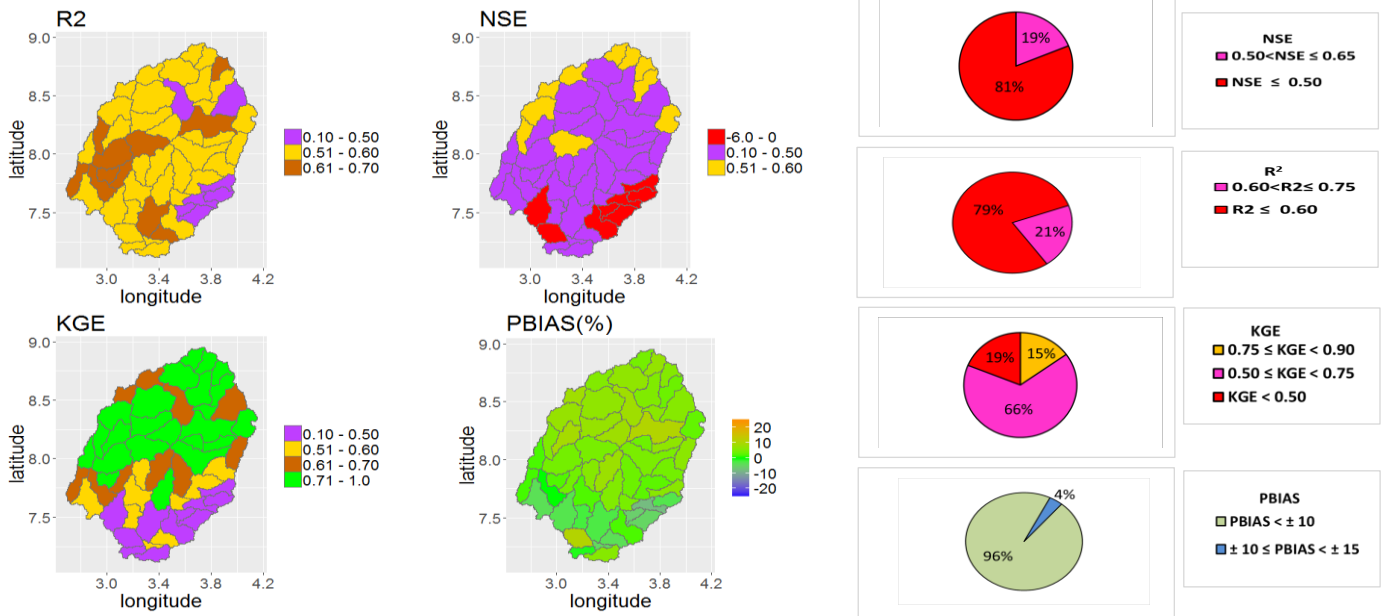Figure S3: Performance metrics (NSE, KGE, R², and PBIAS) of SWAT (SWAT_P-M) when calibrated with GLEAM_v3.0a (GS3).

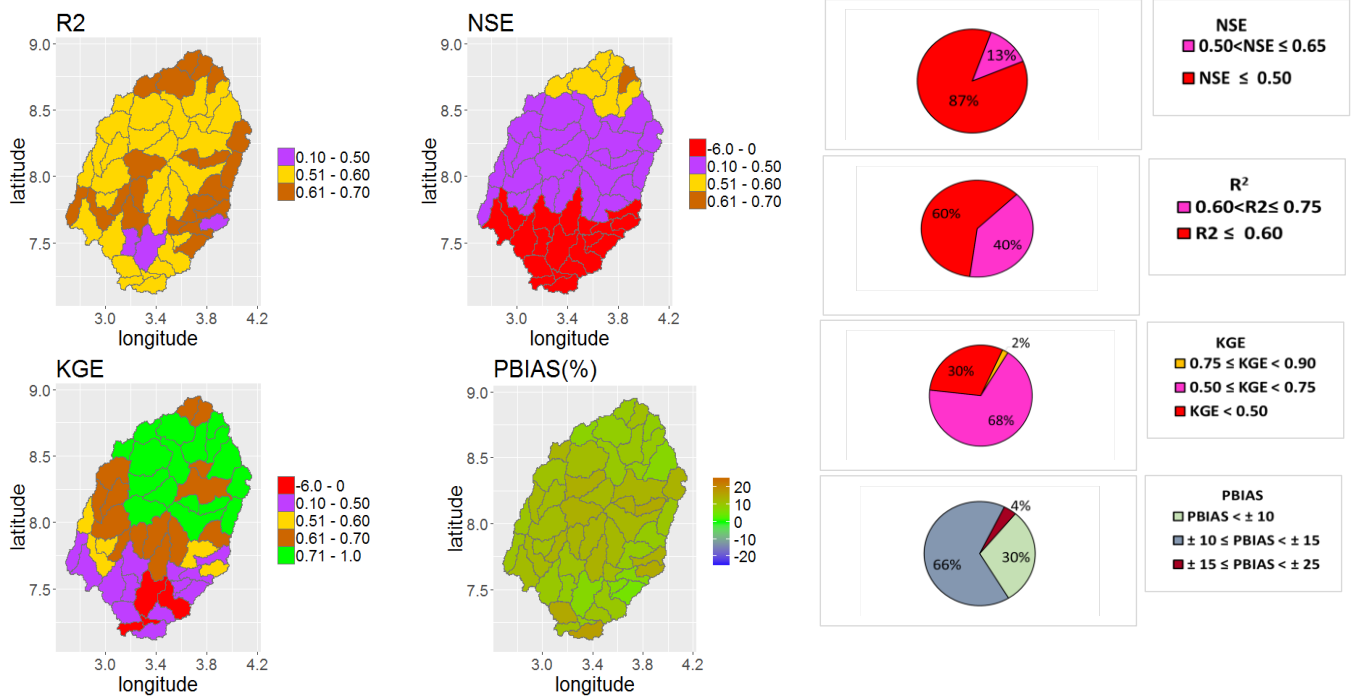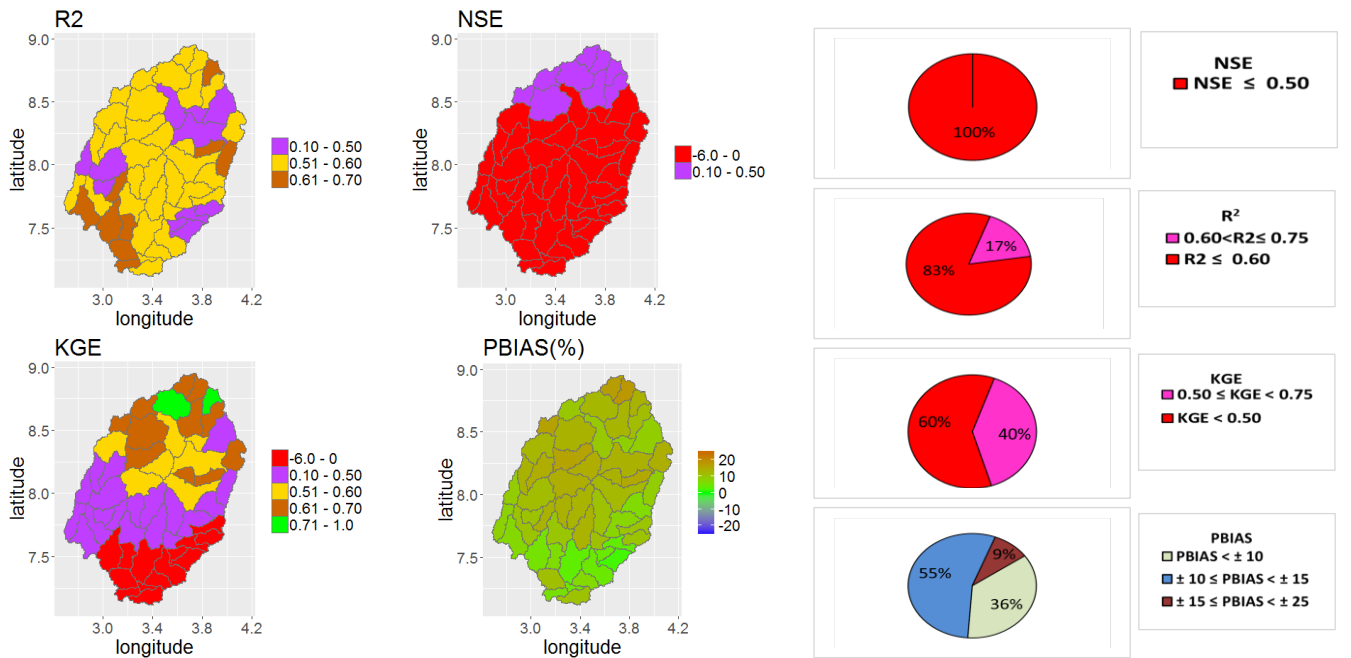Figure S4: Performance metrics (NSE, KGE, R2, and PBIAS) of SWAT (SWAT_P-M) when validated with GLEAM_v3.0a (GS3).

Figure S5: Performance metrics (NSE, KGE, R², and PBIAS) of SWAT (SWAT_HG) when calibrated with MOD16 (MS4).

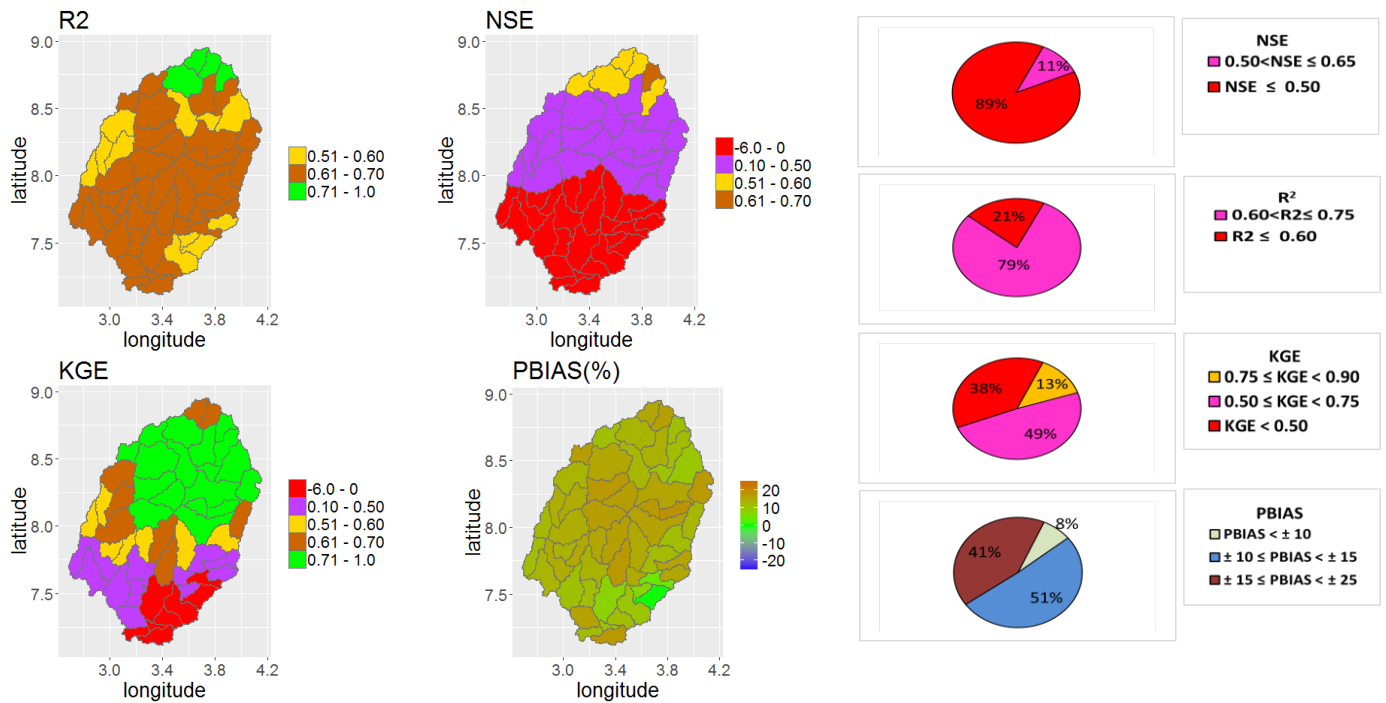5   **Figure S6: Performance metrics (NSE, KGE, R², and PBIAS) of SWAT (SWAT_HG) when validated with MOD16 (MS4).**

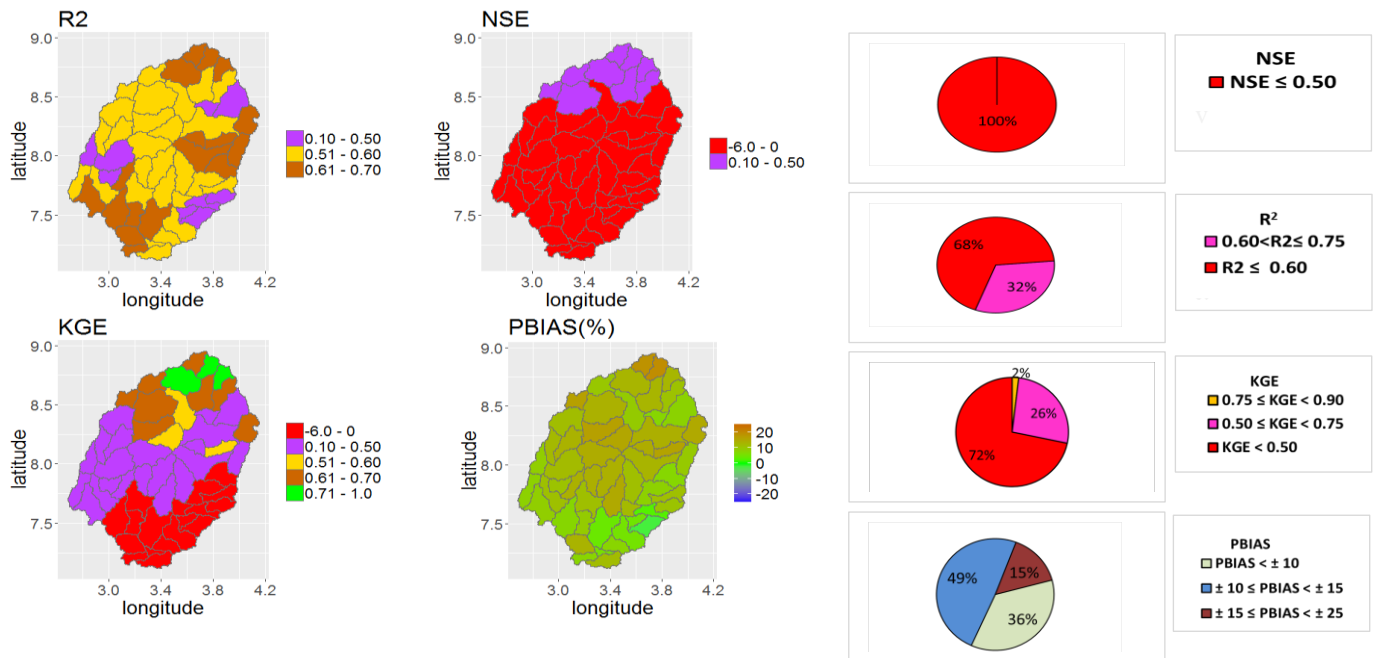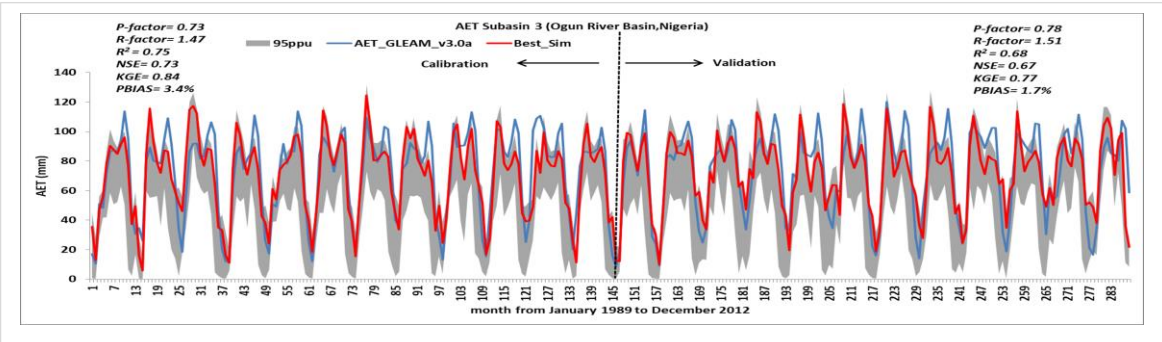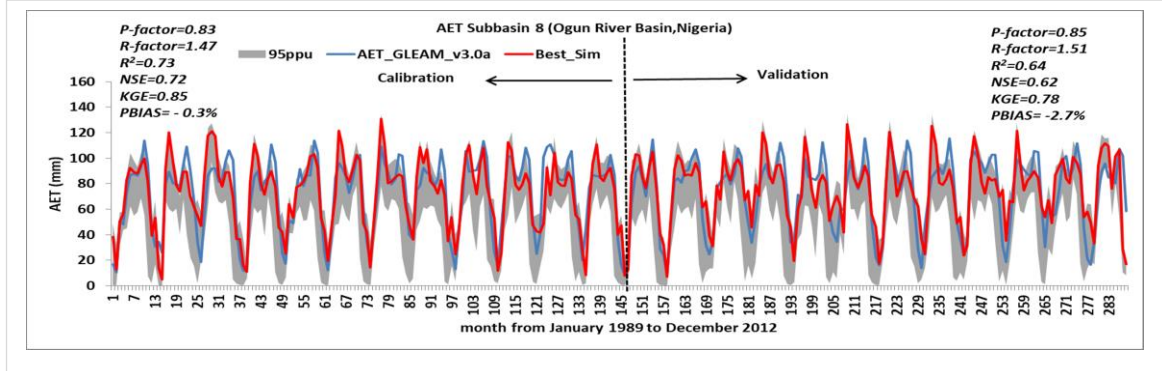**Figure S7: Performance metrics (NSE, KGE, R², and PBIAS) of SWAT (SWAT_P-T) when calibrated with MOD16 (MS5).**

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Figure S8: Performance metrics (NSE, KGE, R2, and PBIAS) of SWAT (SWAT_P-T) when validated with MOD16 (MS5).
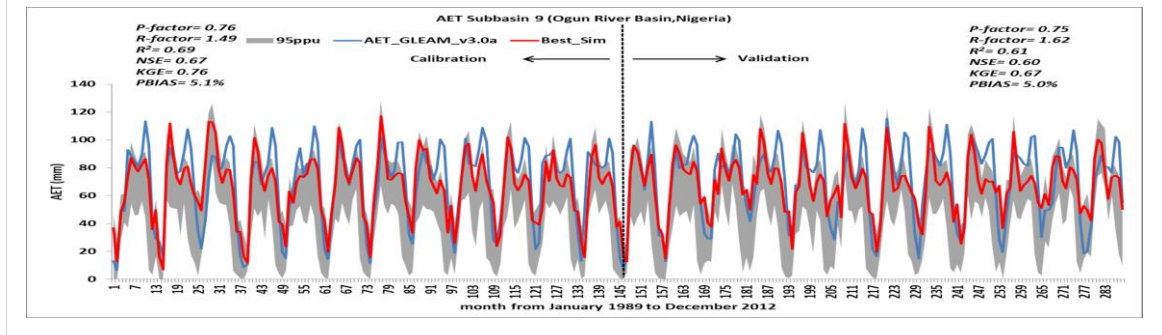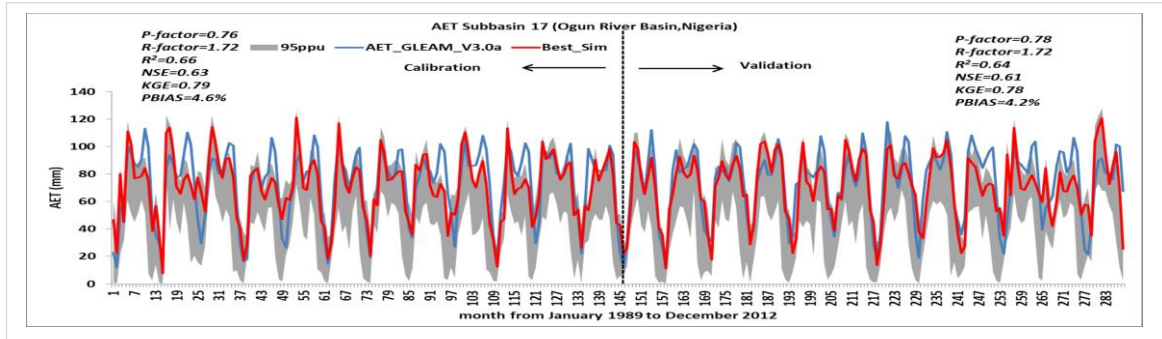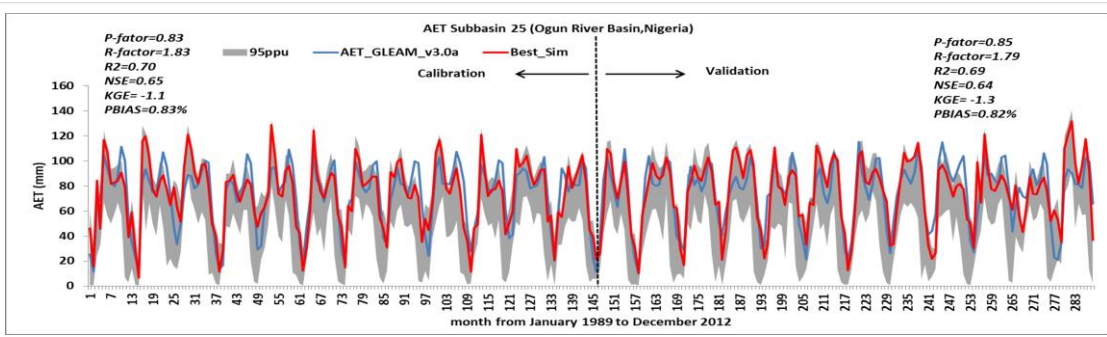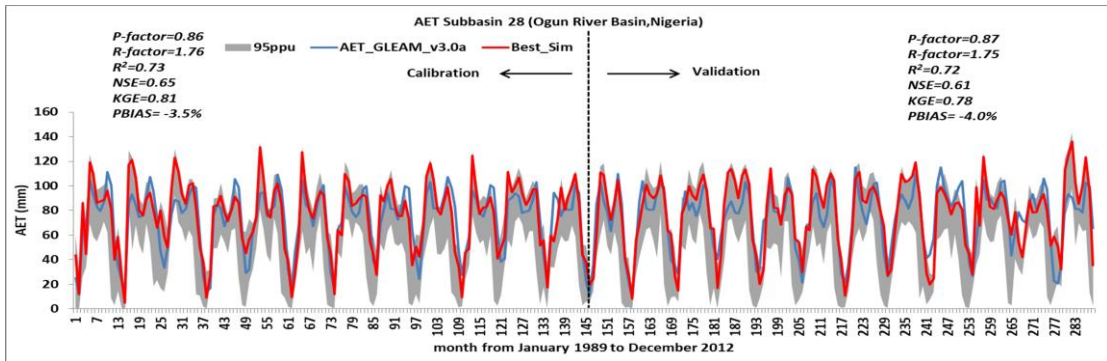
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Figure S9: Extracts of the monthly calibration and validation results (GSI) for the selected upstream subbasins (with subbasin 17 where the Ikere gorge dam is located) showing the 95% prediction uncertainty interval along with the best SWAT simulated actual evapotranspiration and the satellite based actual evapotranspiration (GLEAM-v3.0a).

Figure S10: Extracts of the monthly calibration and validation results (GSI) for the selected subbasins (located at the middle of the watershed) showing the 95% prediction uncertainty interval along with the best SWAT simulated actual evapotranspiration and the satellite based actual evapotranspiration (GLEAM-v3.0a)
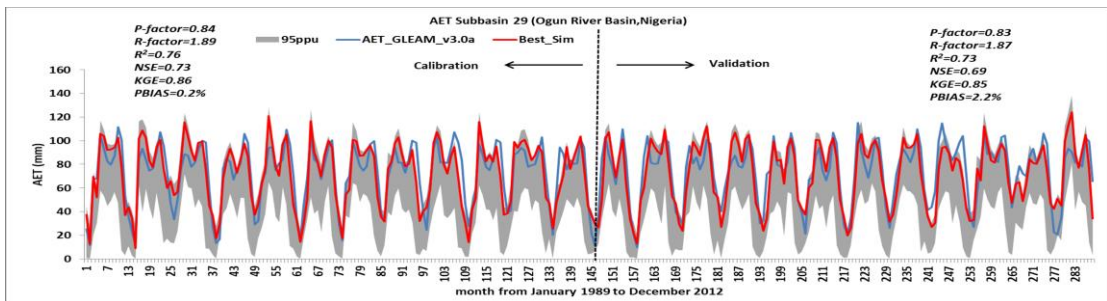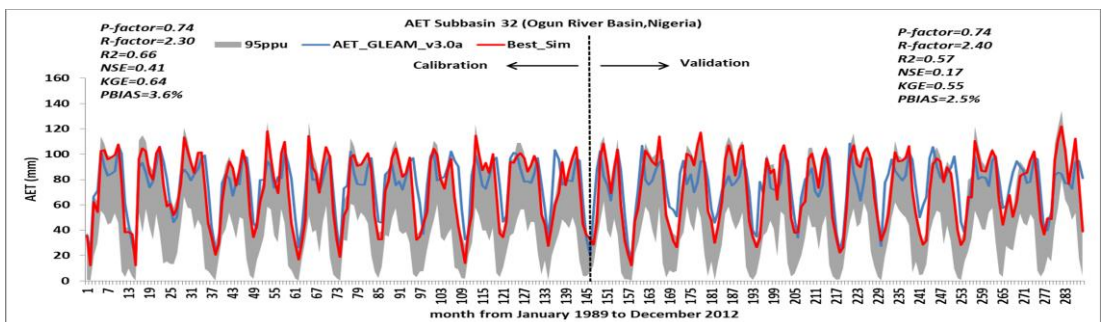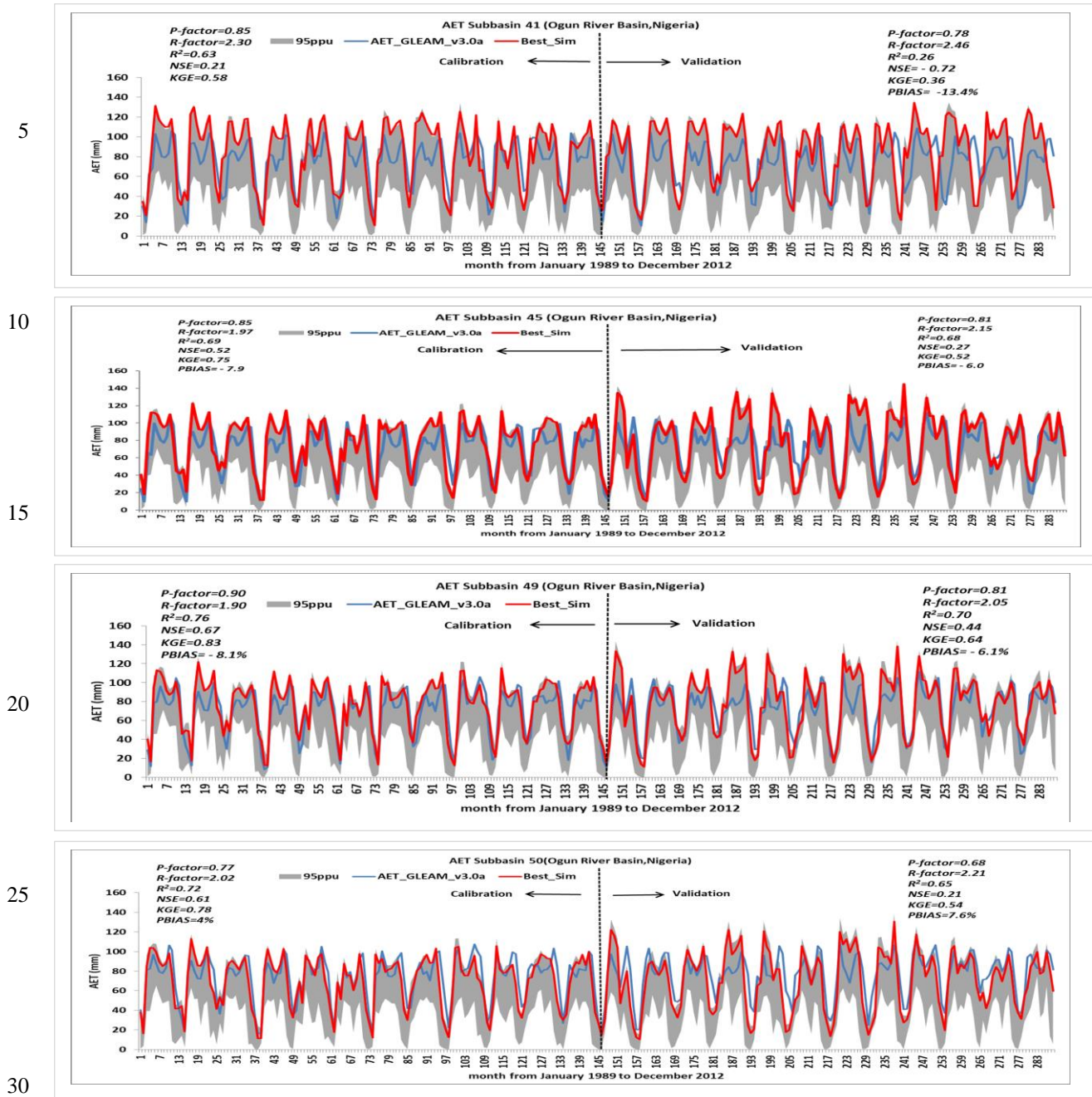
Figure S11: Extracts of the monthly calibration and validation results (GSI) for the selected downstream subbasins (including subbasin 50 where the Oyan dam is located) showing the 95% prediction uncertainty interval along with the best SWAT simulated actual evapotranspiration and the satellite based actual evapotranspiration (GLEAM-v3.0a).