



Supplement of

Technical note: RAT – a robustness assessment test for calibrated and uncalibrated hydrological models

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Supplementary Material 1: plots showing streamflow bias obtained with the RAT and the GSST as a function of temperature, precipitation and humidity index anomalies, for all test catchments

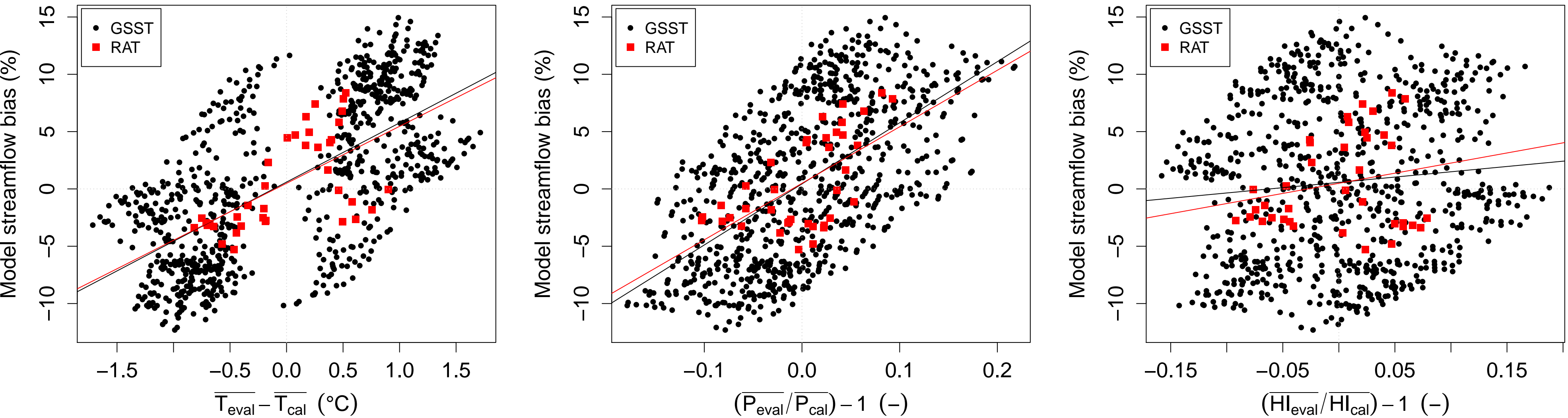


Figure 1. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment A1080330

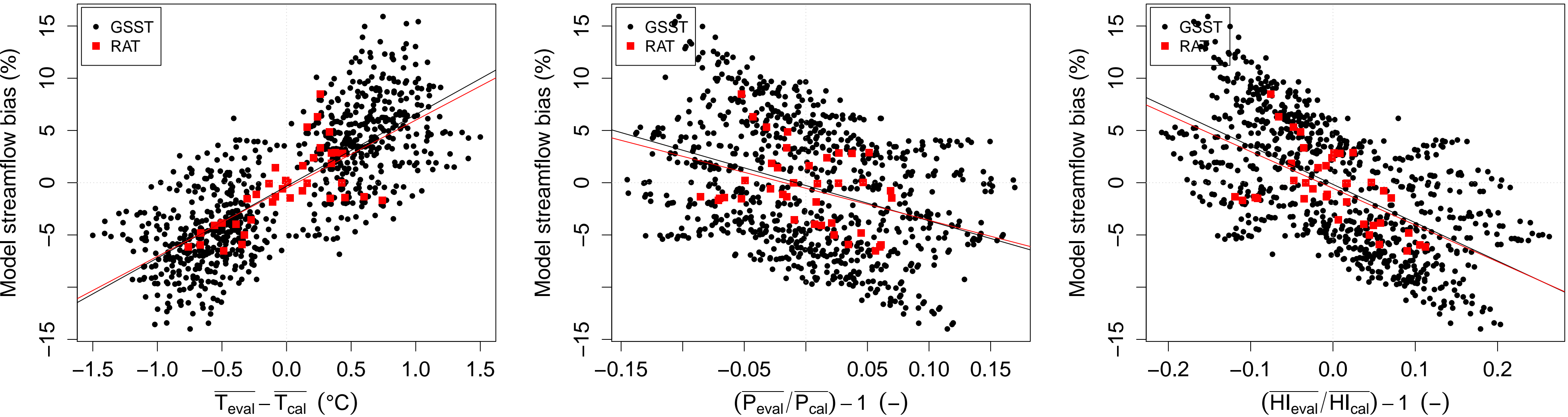


Figure 2. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment B2220010

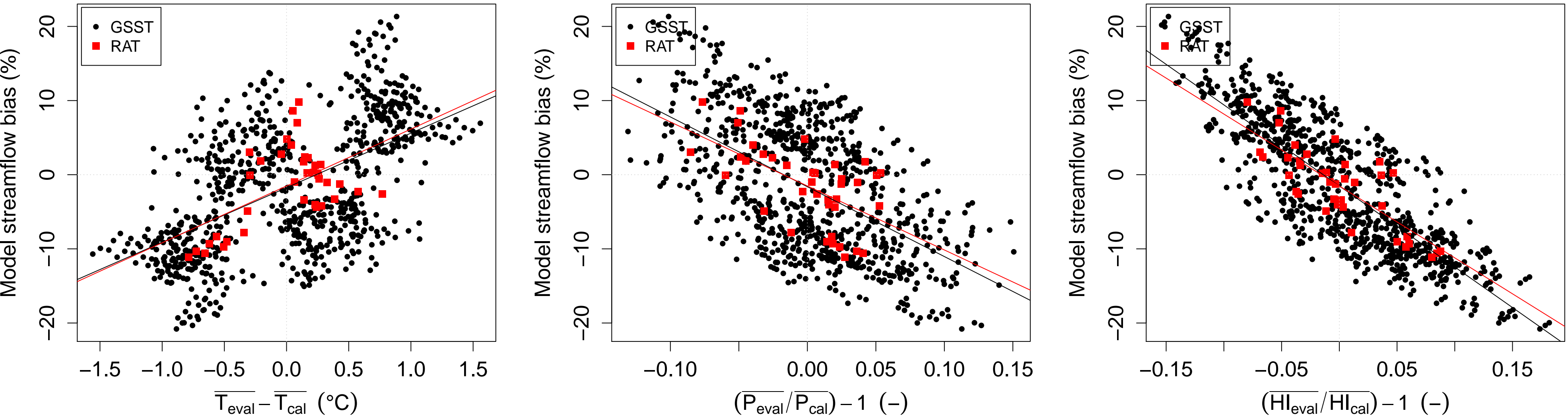


Figure 3. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment H2342020

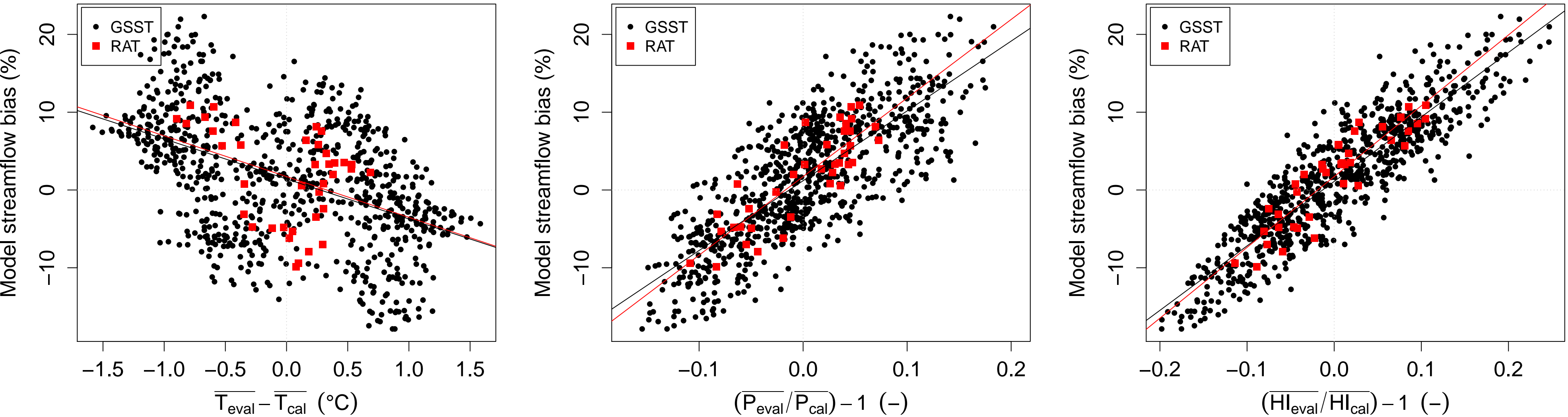


Figure 4. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment H4252010

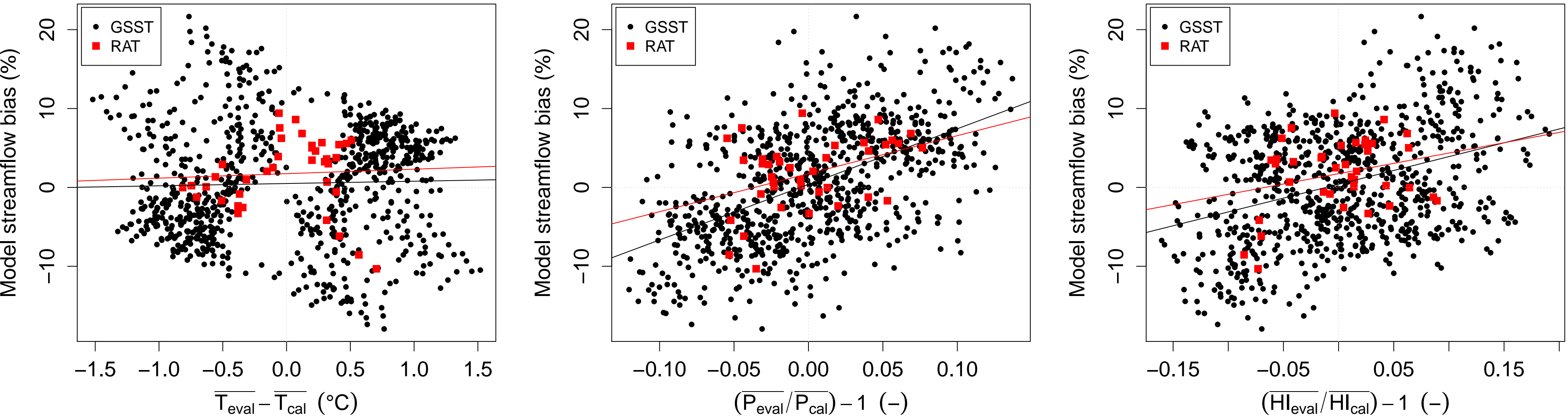


Figure 5. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment H7401010

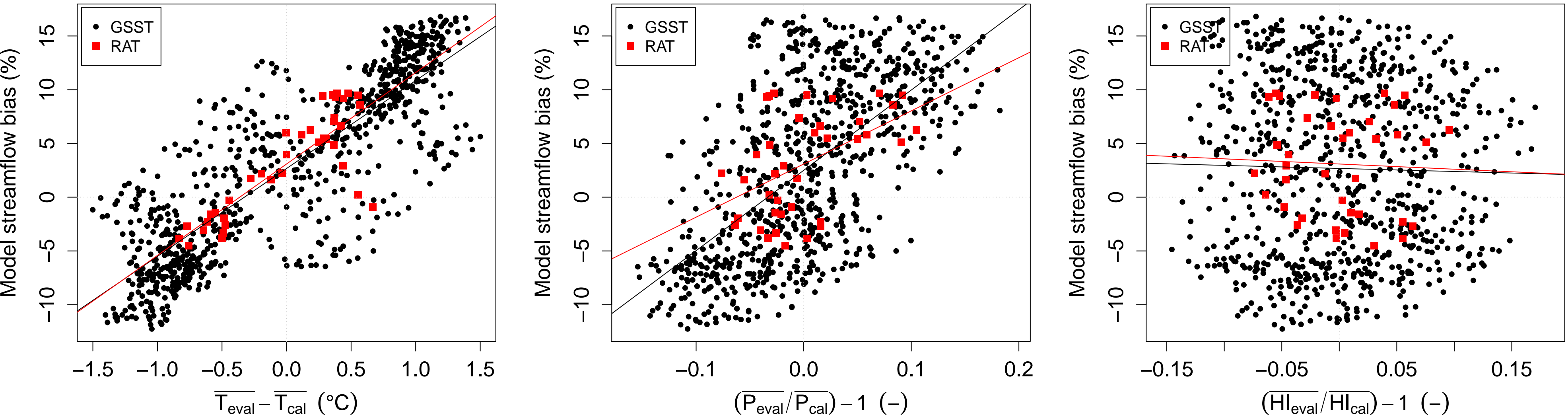


Figure 6. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment H8212010

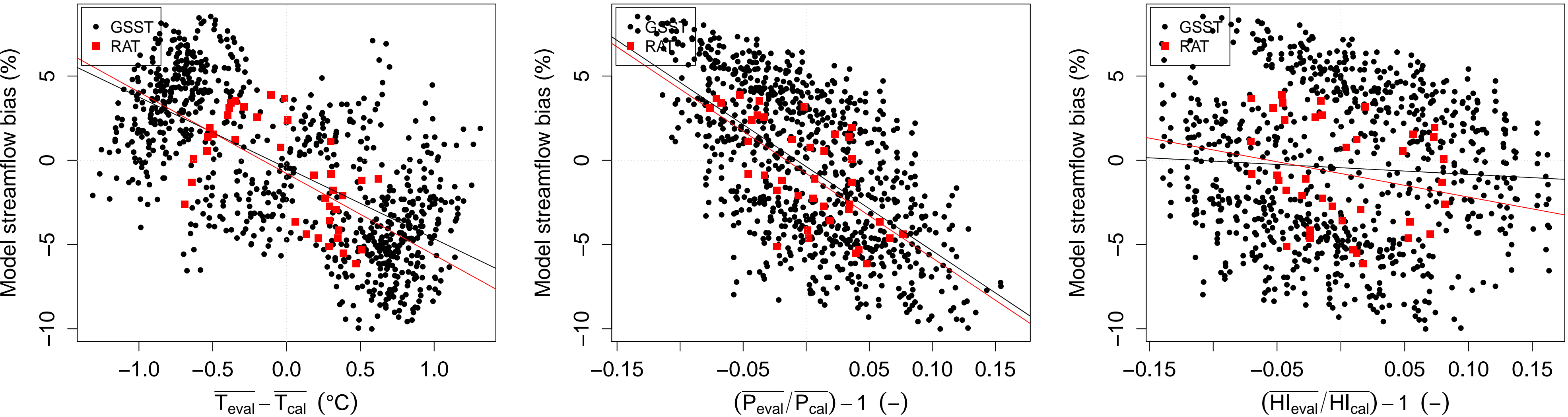


Figure 7. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment I5221010

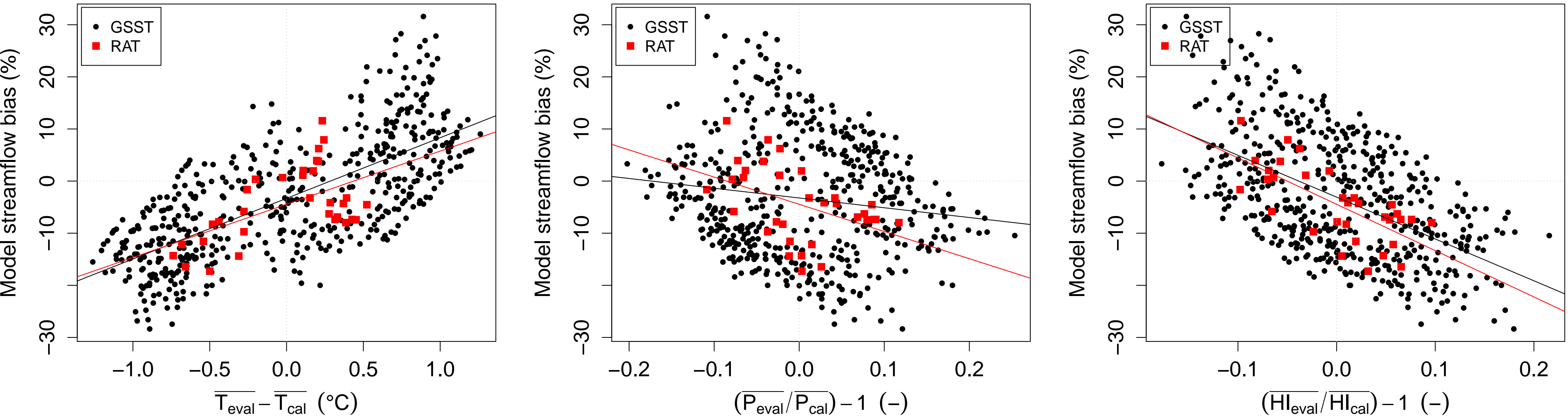


Figure 8. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment J7483010

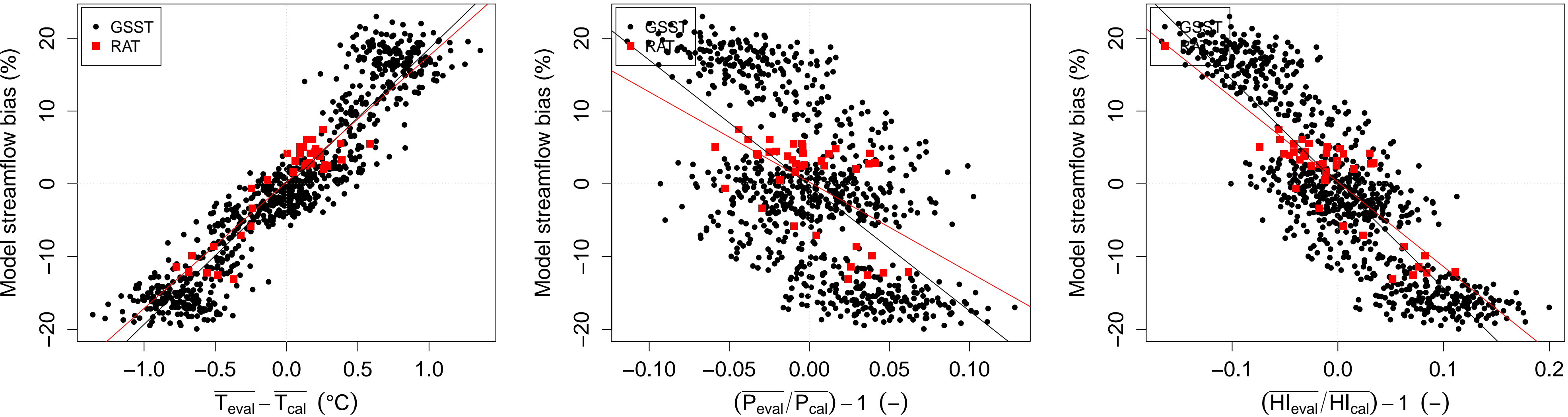


Figure 9. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment K1321810

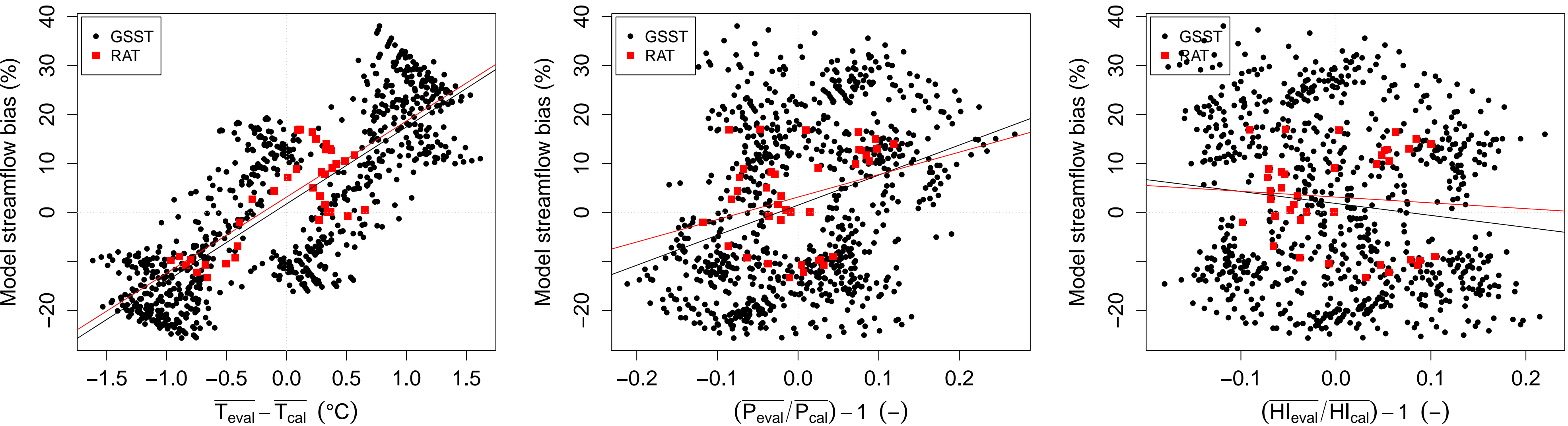


Figure 10. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment K6402520

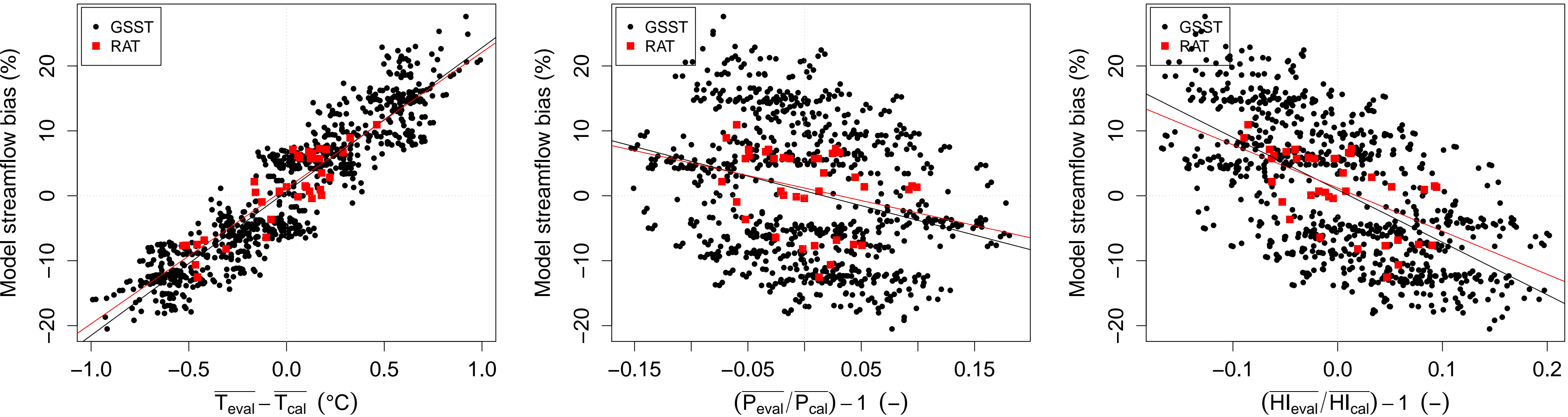


Figure 11. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment L0563010

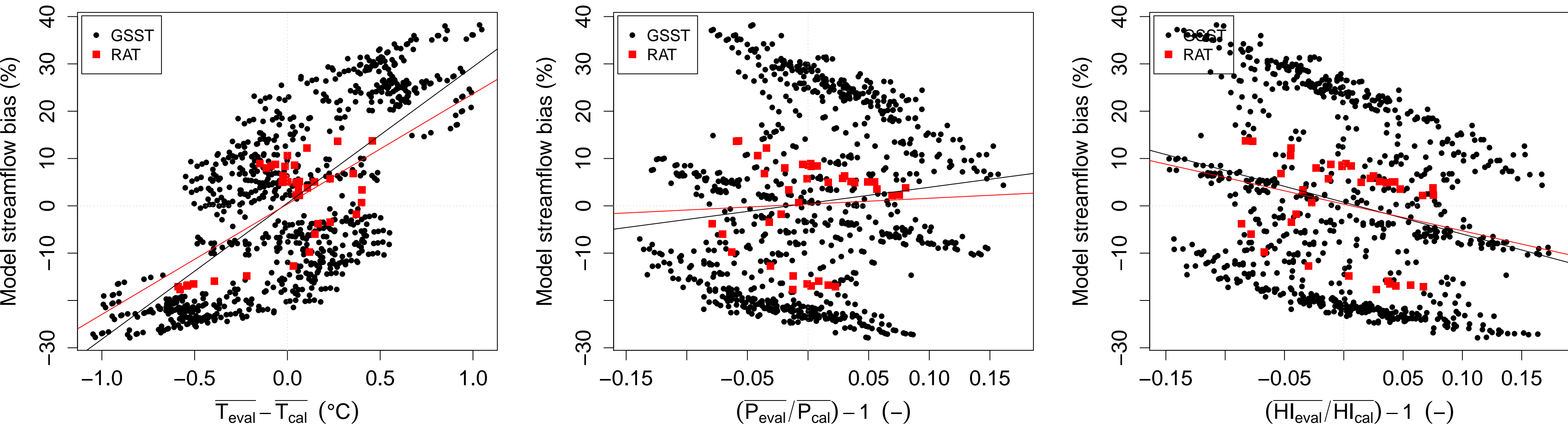


Figure 12. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment L4411710

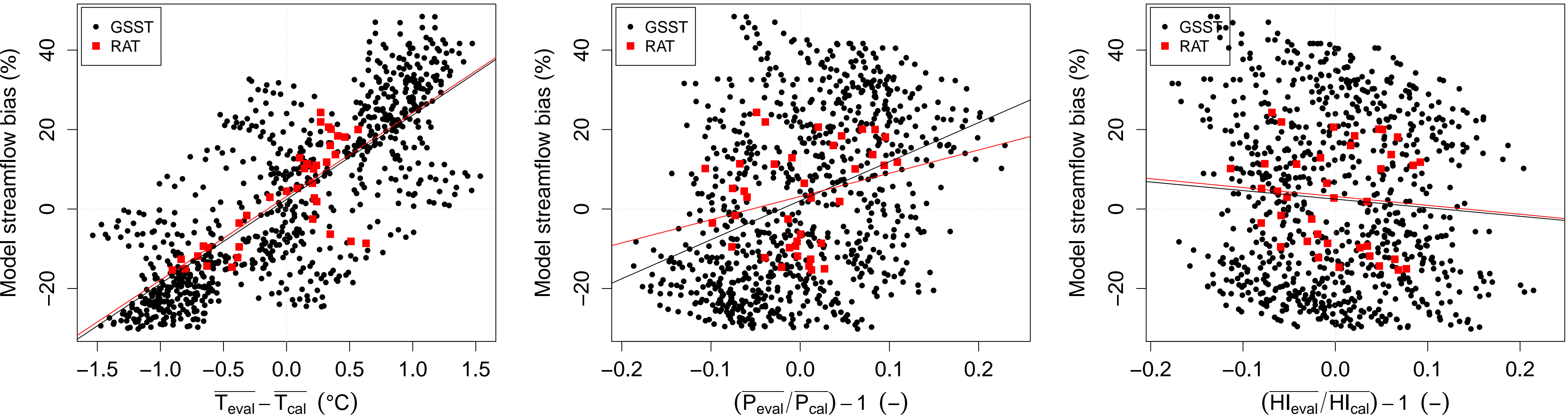


Figure 13. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment M0243010

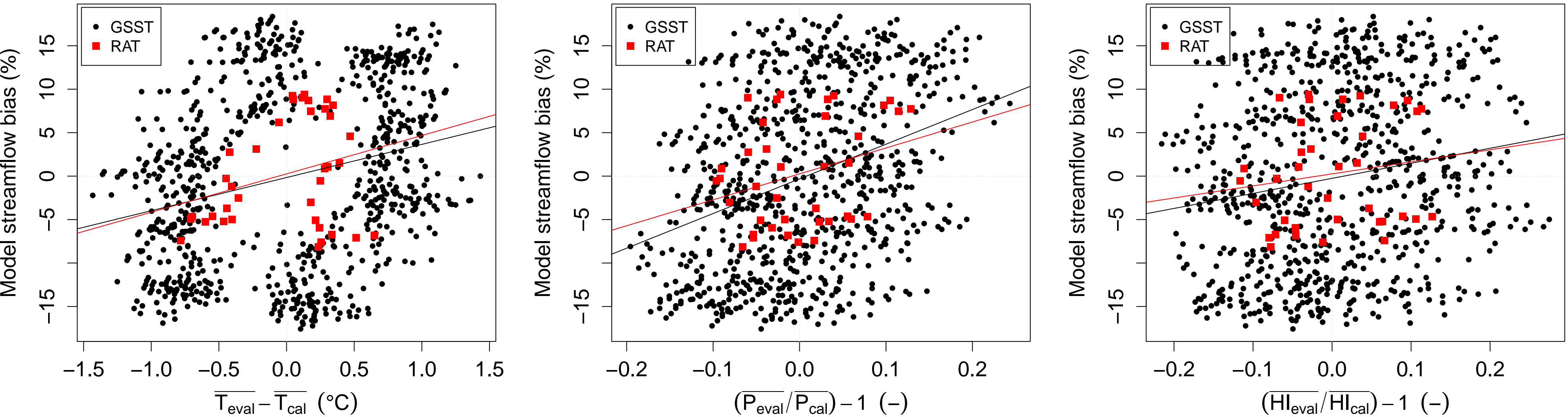


Figure 14. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment M7112410

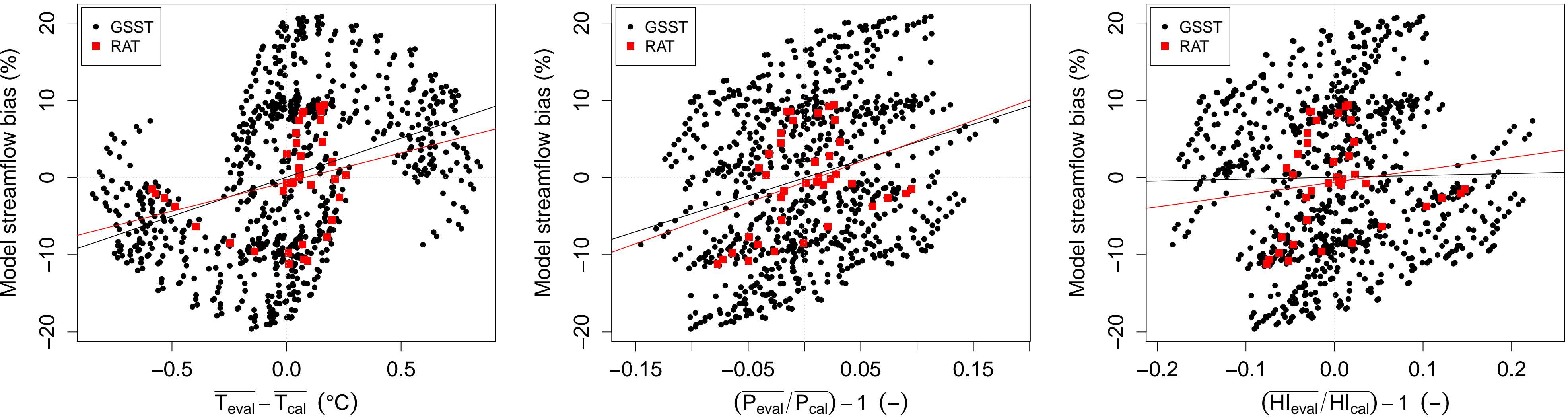


Figure 15. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment O0592510

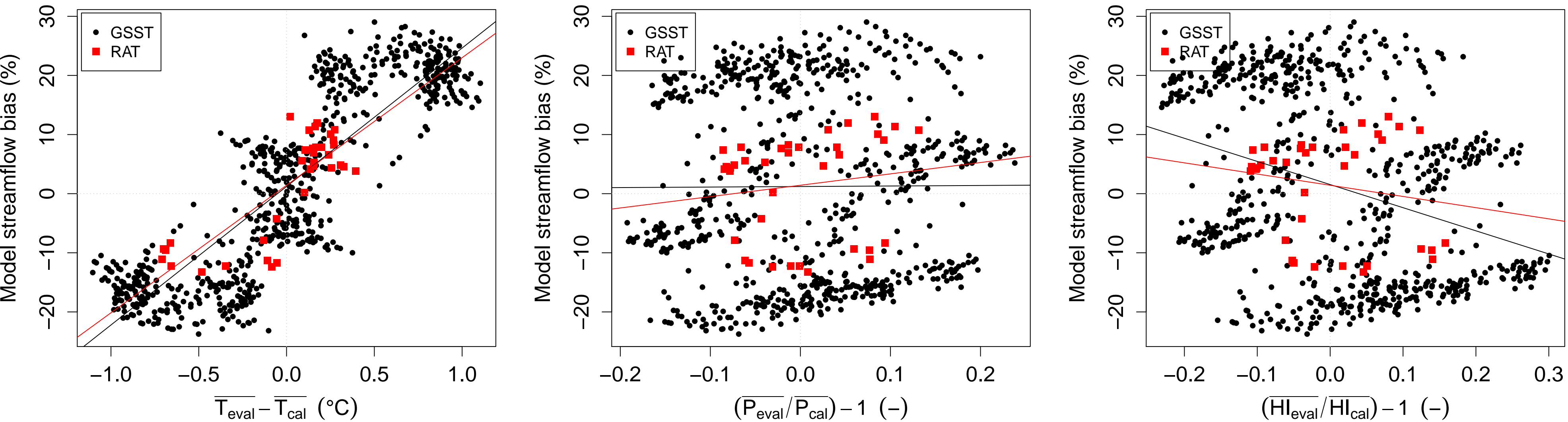


Figure 16. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment O7101510

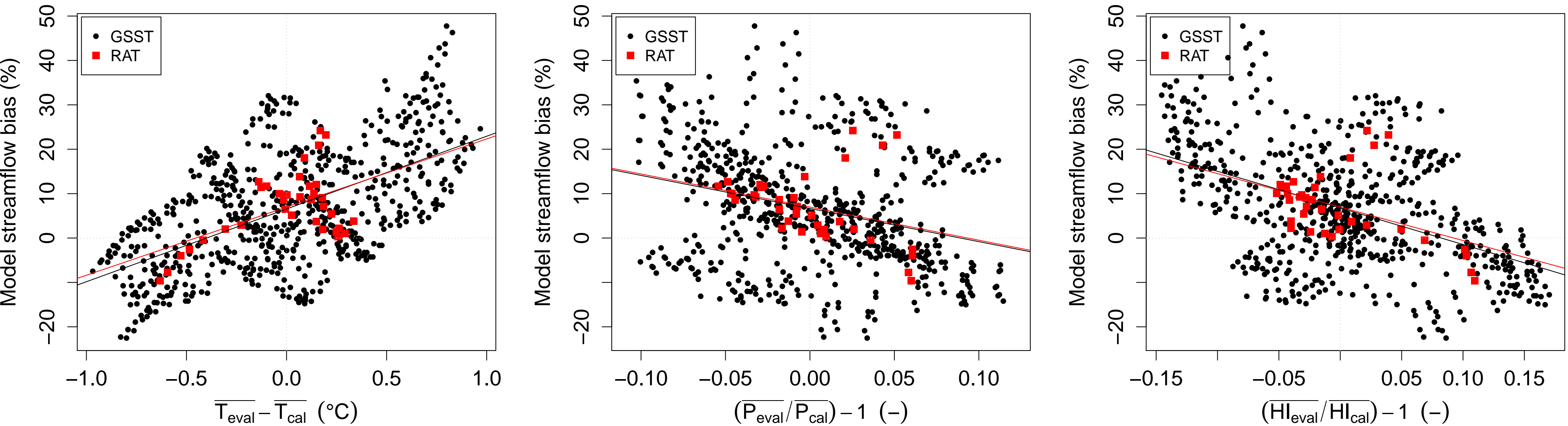


Figure 17. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment Q5501010

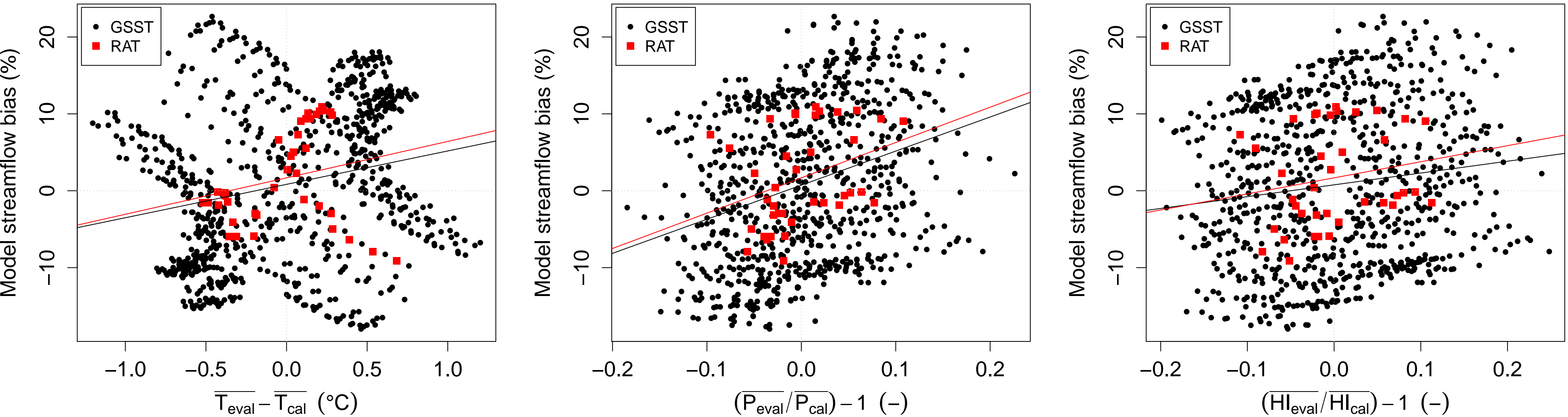


Figure 18. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment S2242510

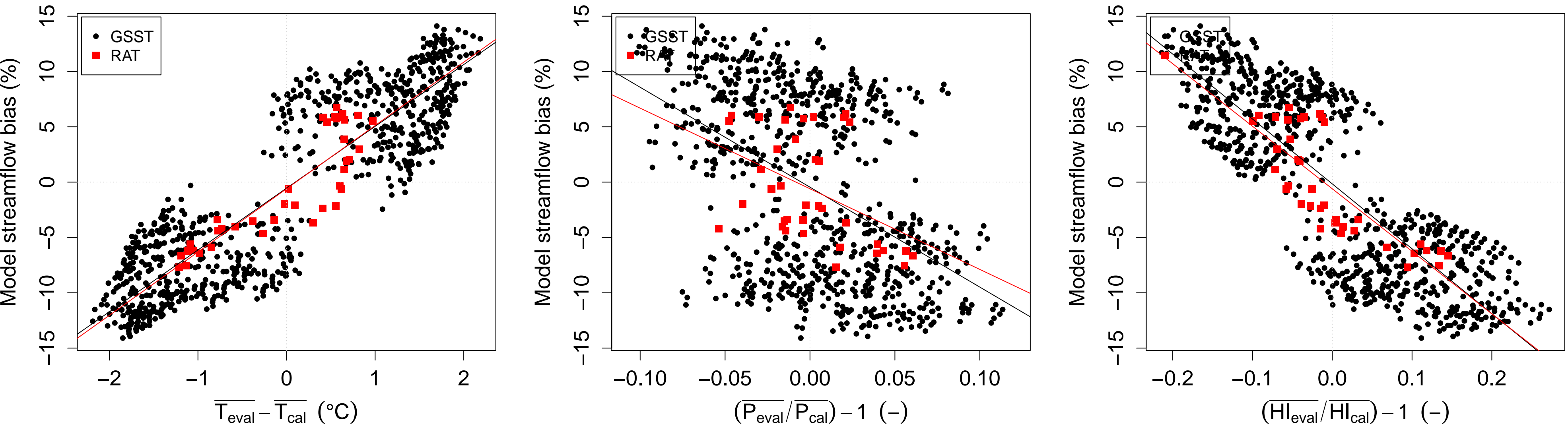


Figure 19. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment U4644010

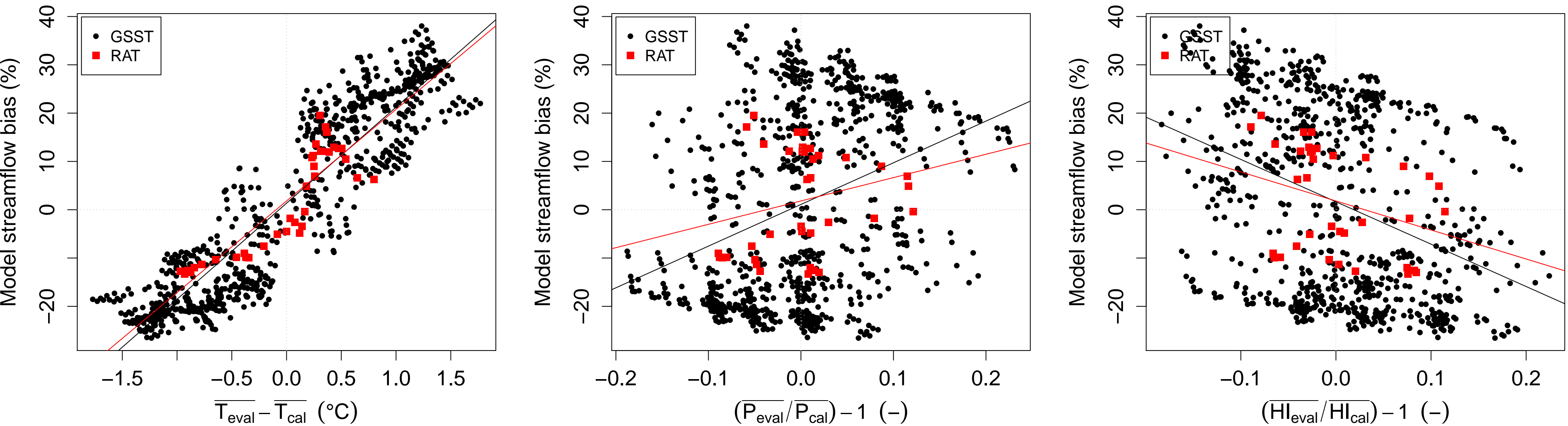


Figure 20. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment V4264010

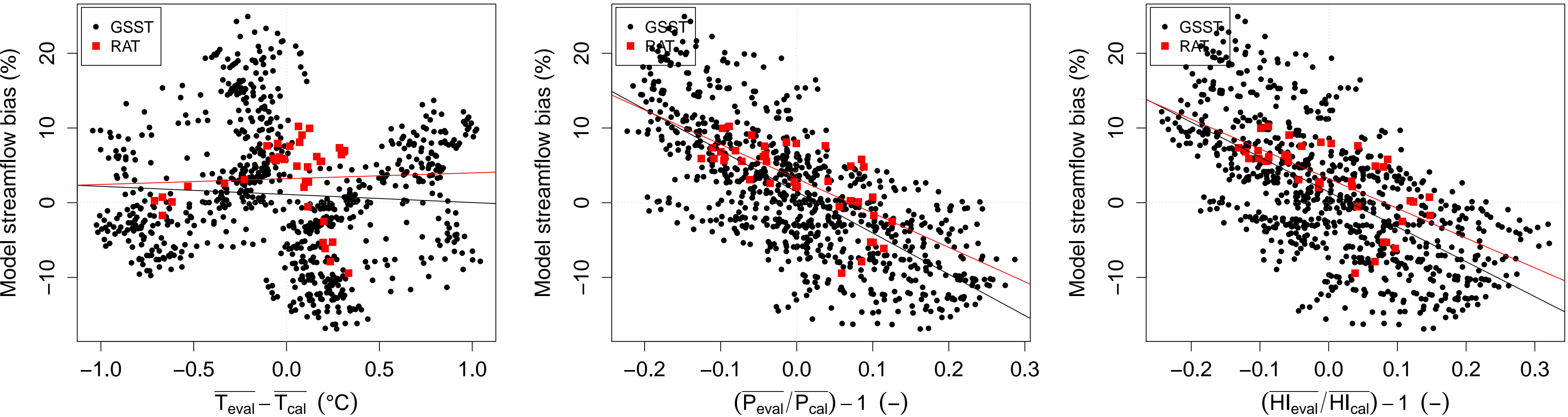


Figure 21. Streamflow bias obtained with the RAT (red squares) and the GSST (black dots), as a function of temperature, precipitation and humidity index anomalies, for the catchment Y4624010

Supplementary Material 2: Plots showing streamflow annual bias obtained with the RAT function of (i) time, (ii) temperature anomalies (iii) precipitation anomalies (iv) humidity index anomalies, for all test catchments

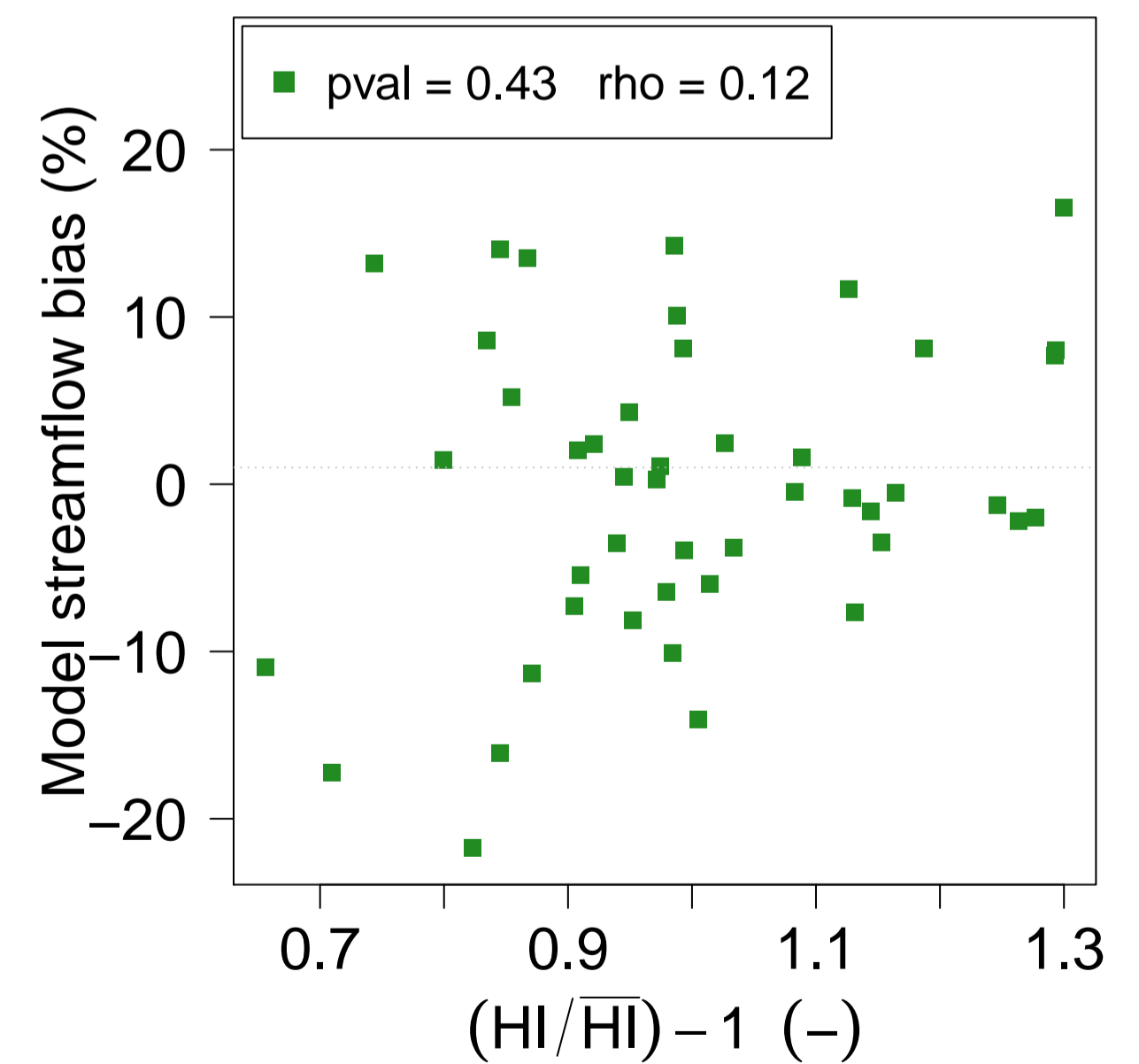
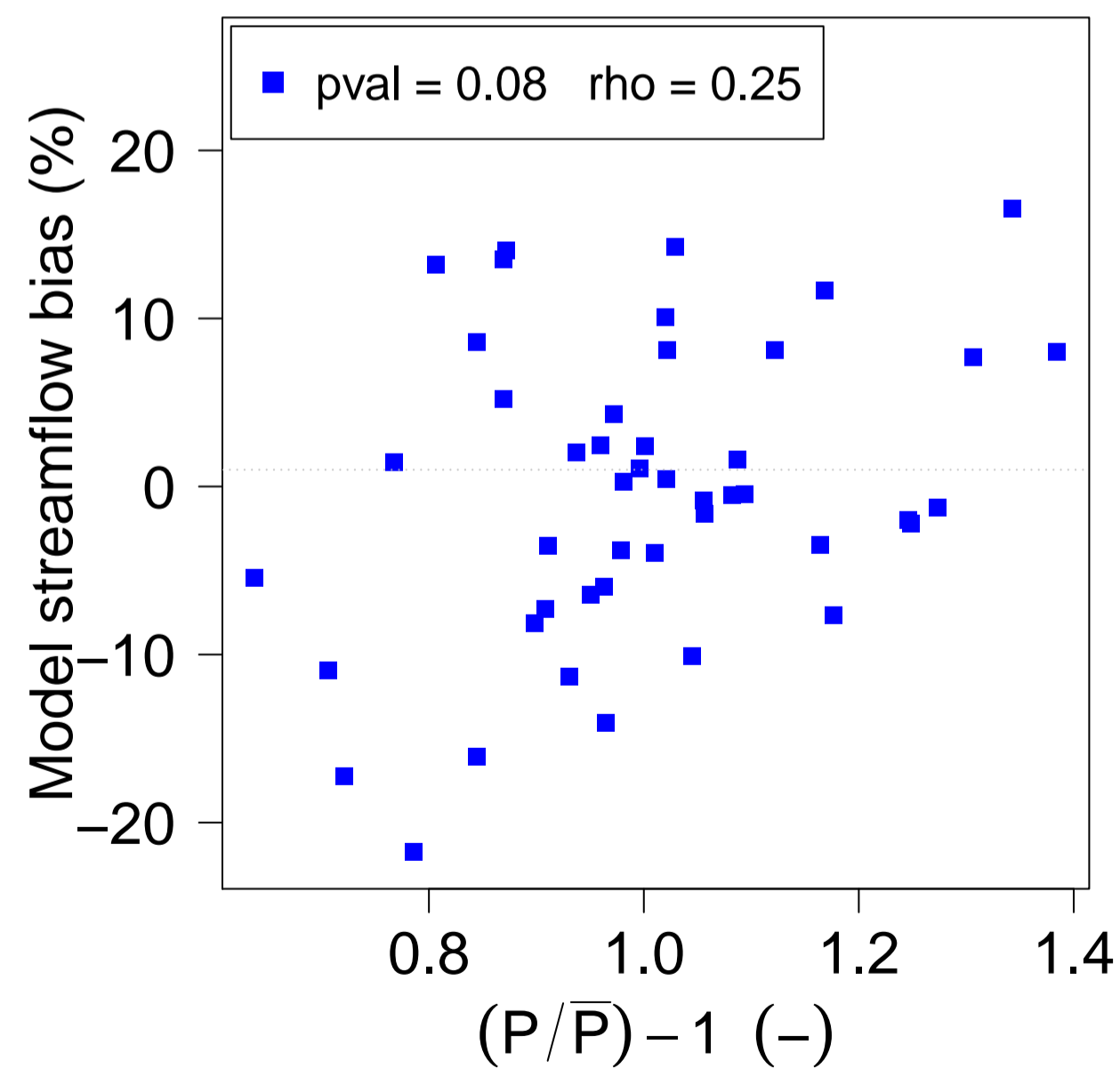
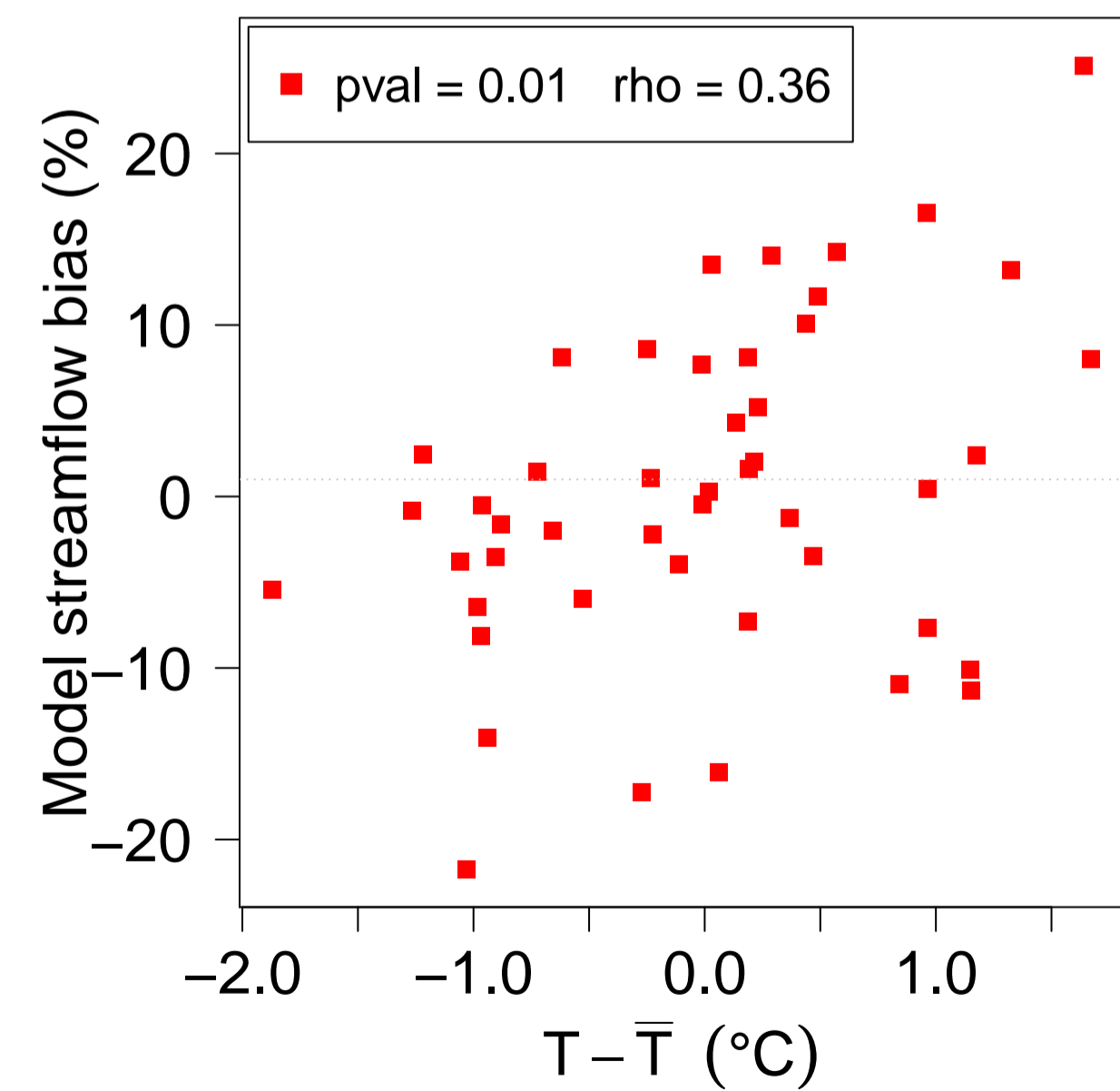
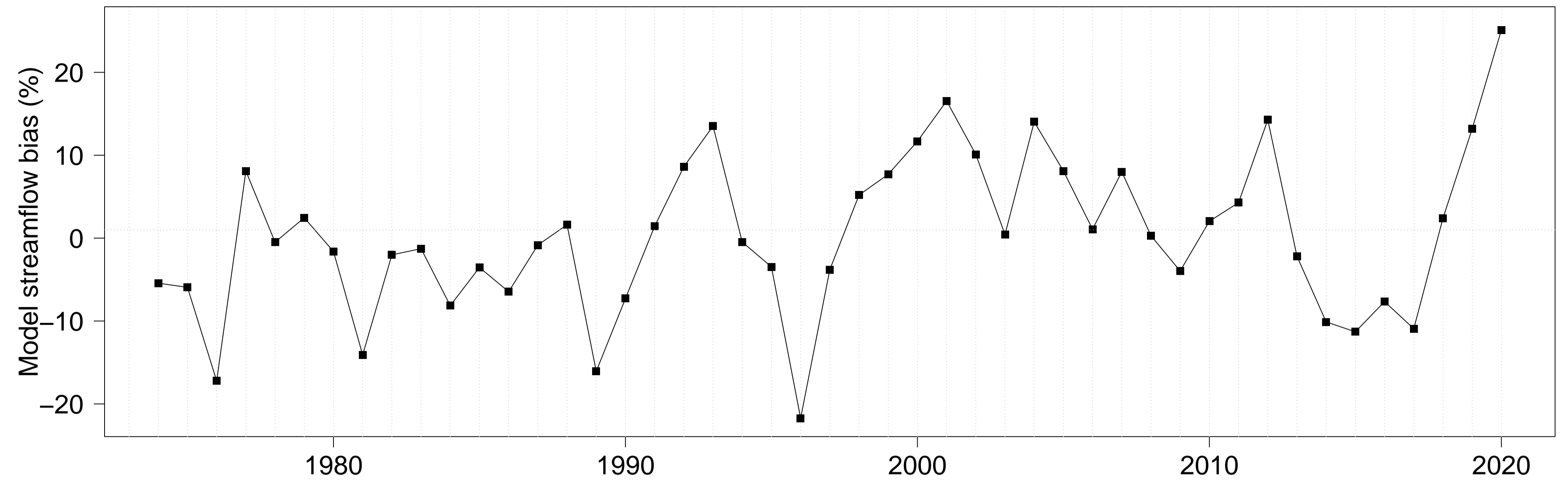


Figure 1. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment A1080330

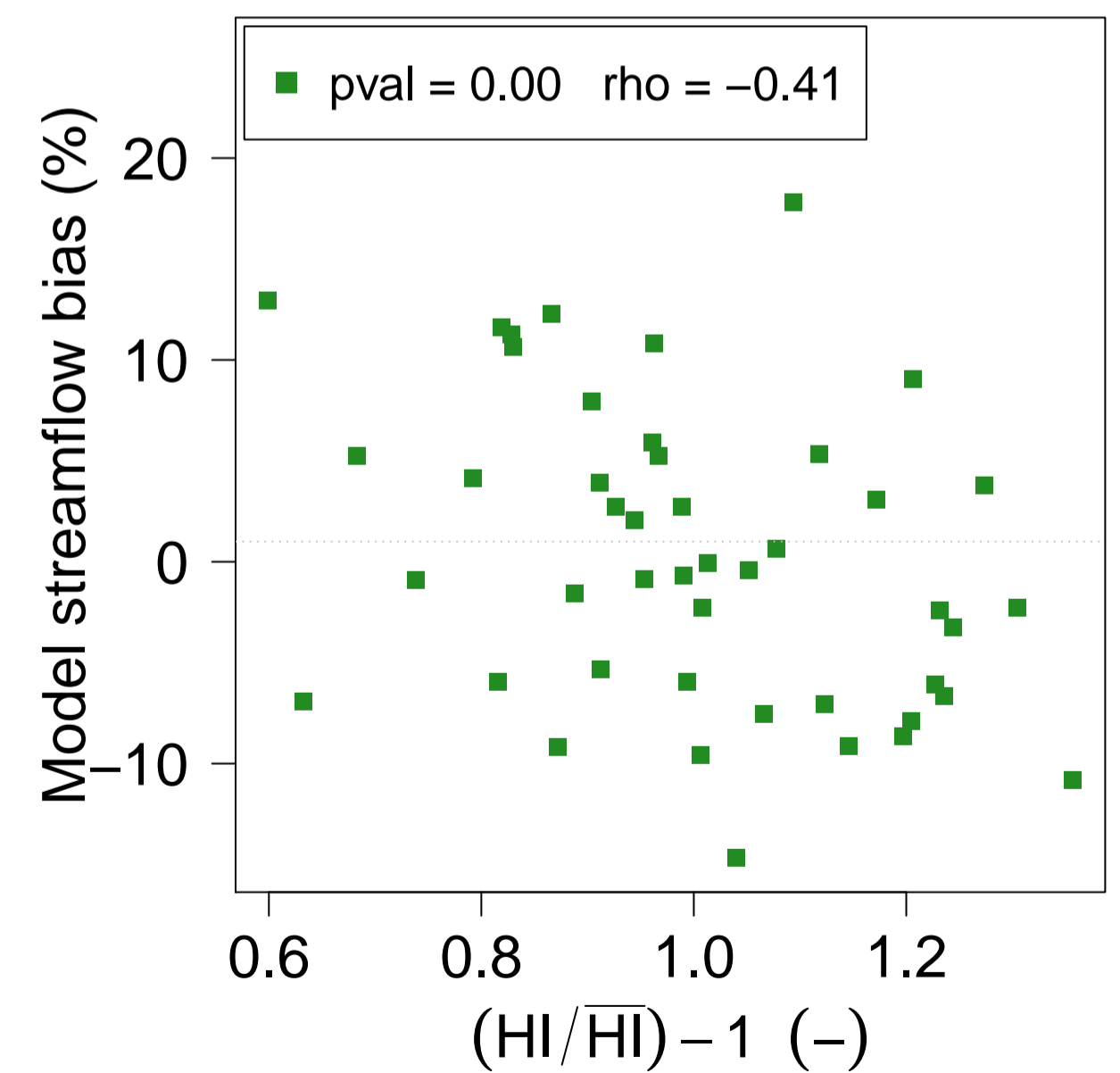
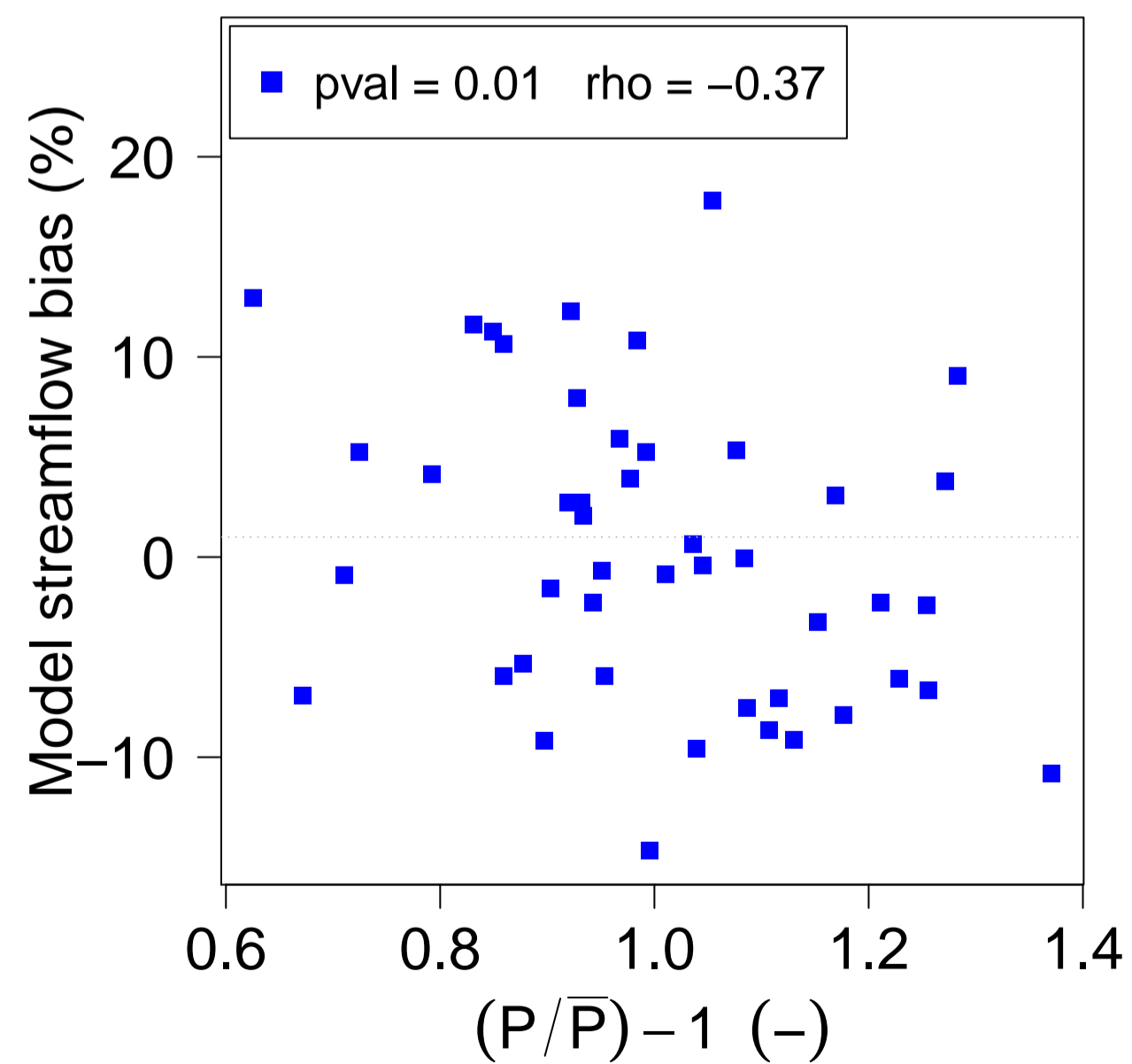
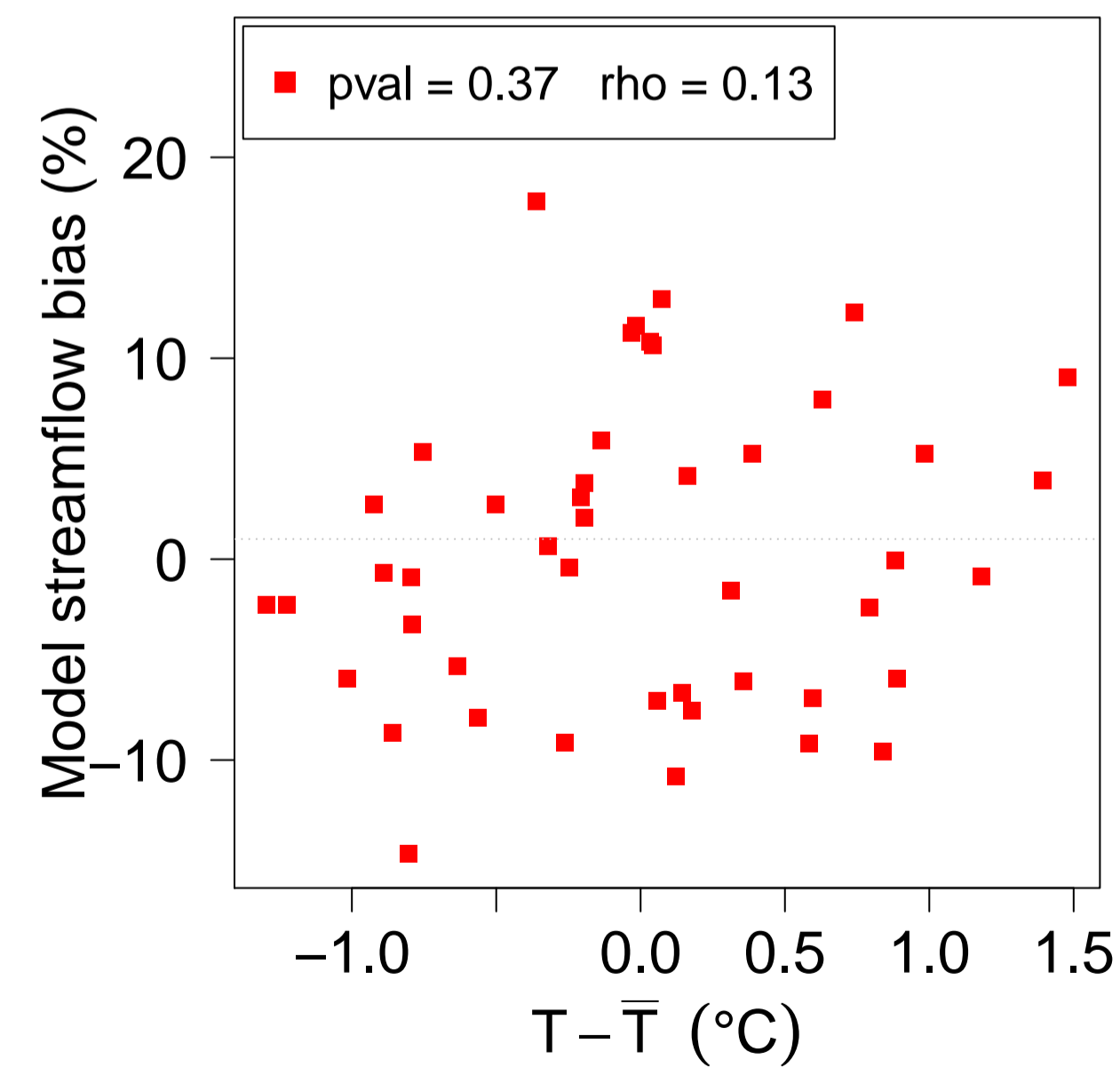
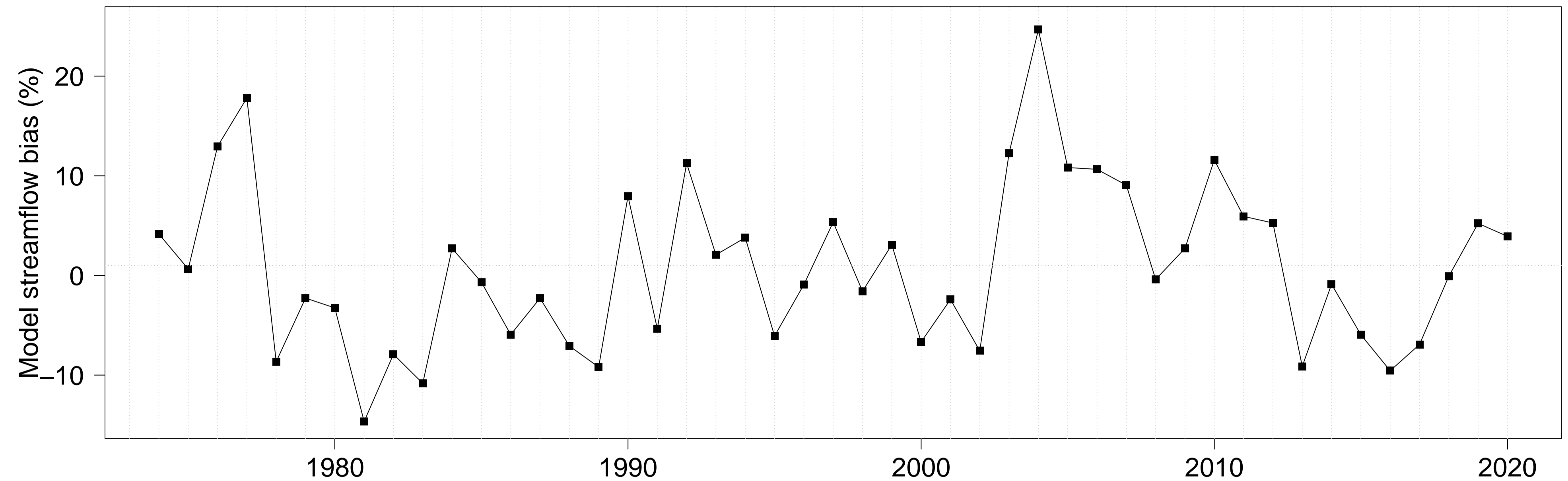


Figure 2. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment B2220010

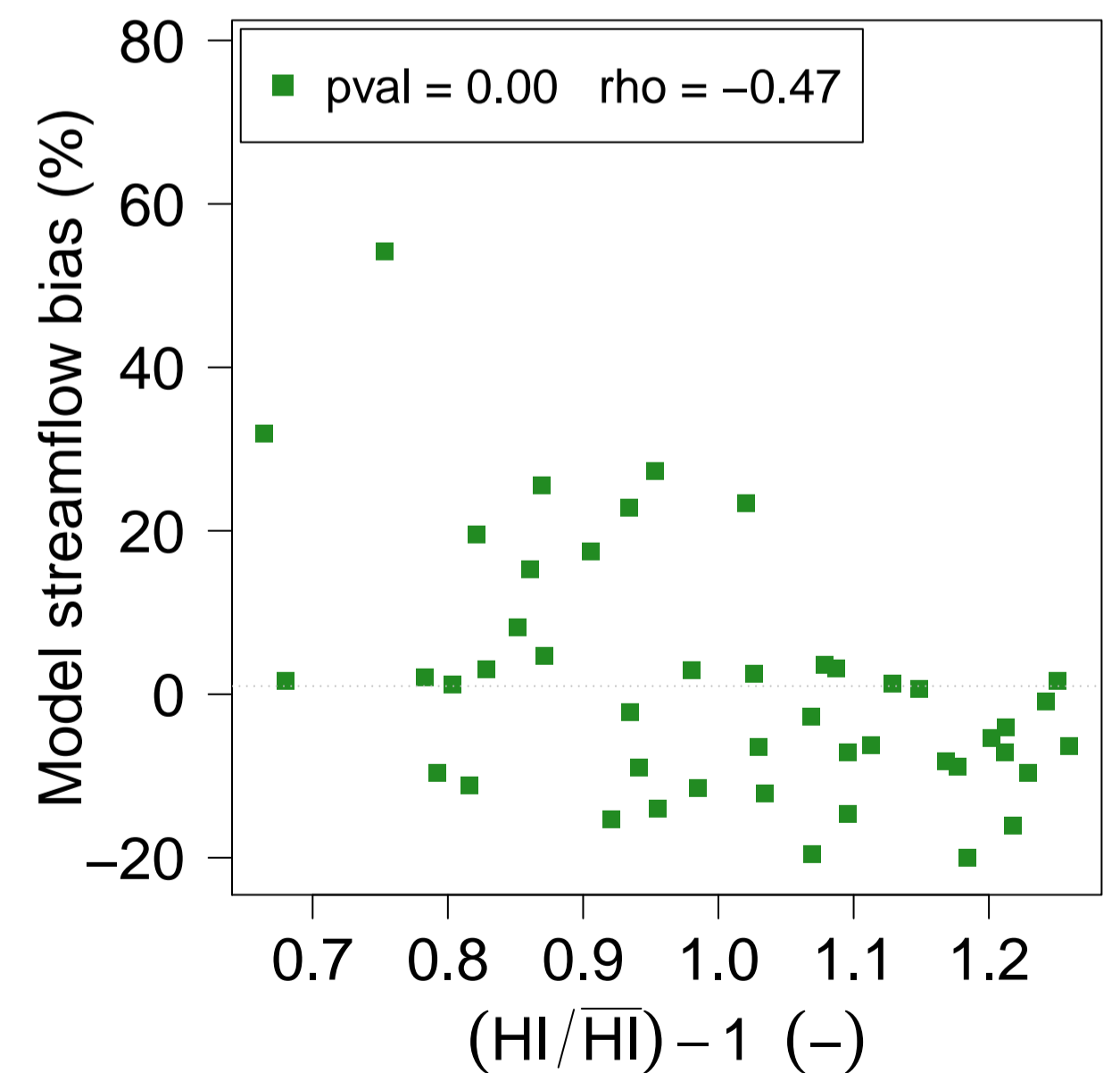
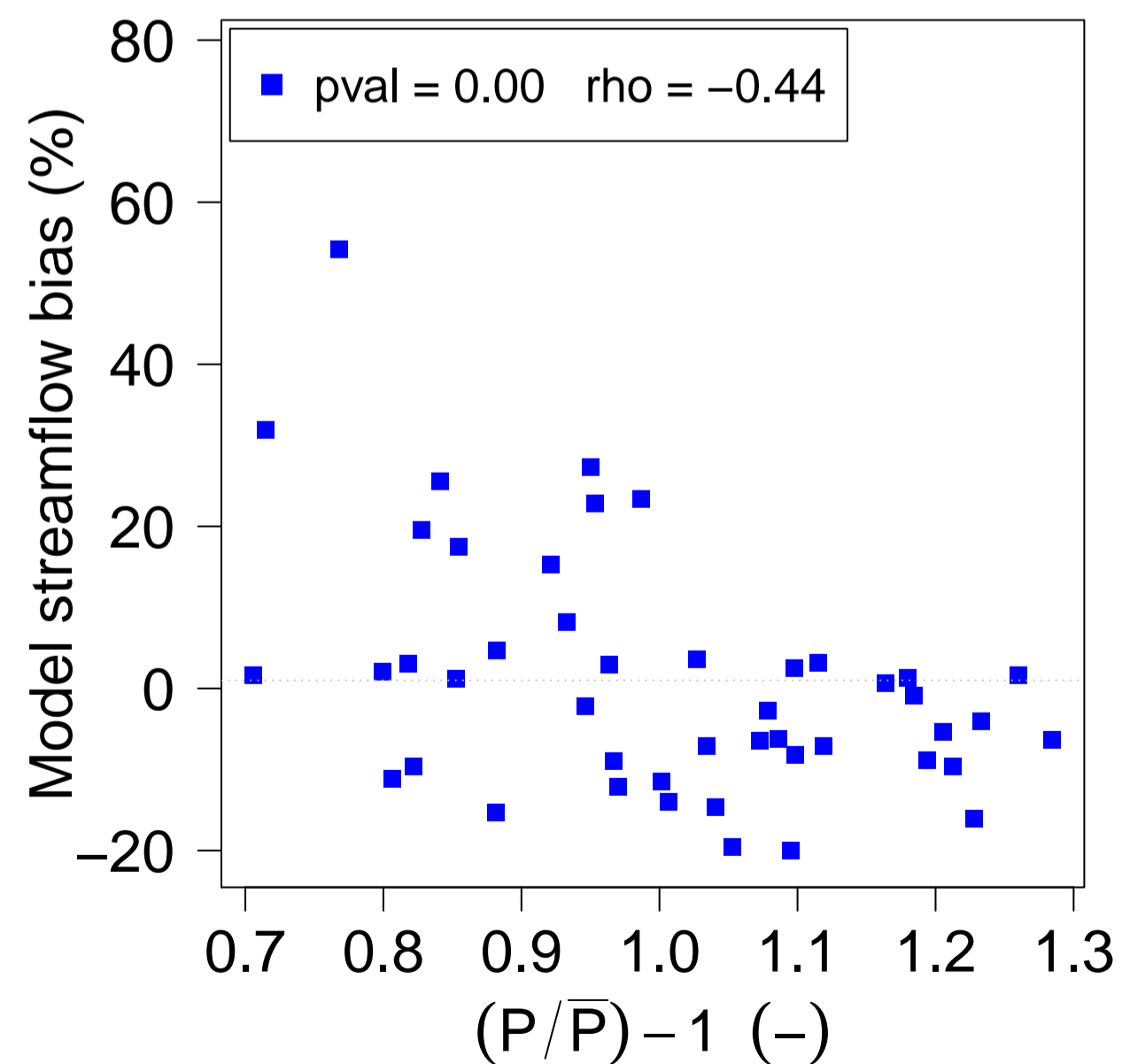
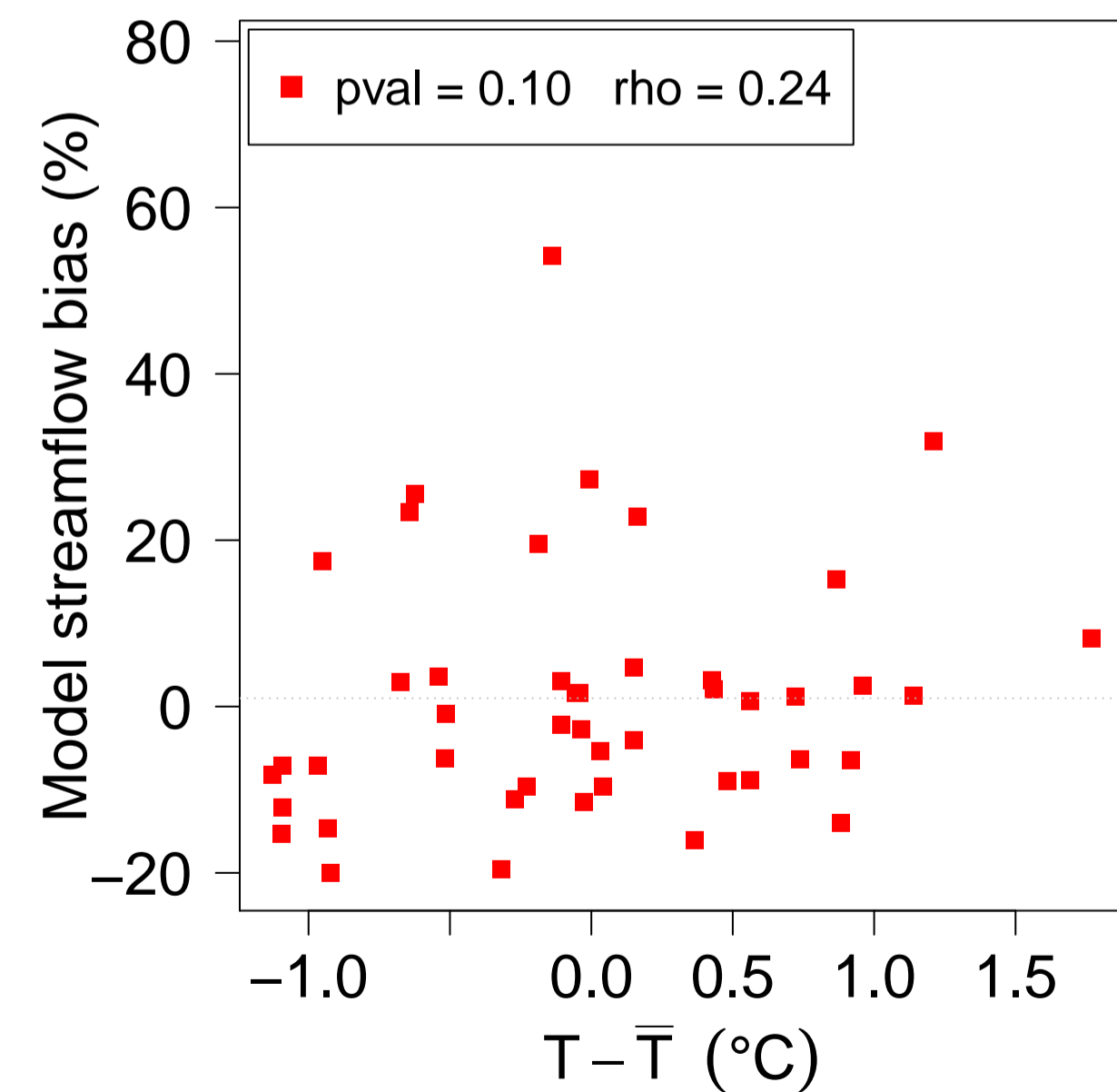
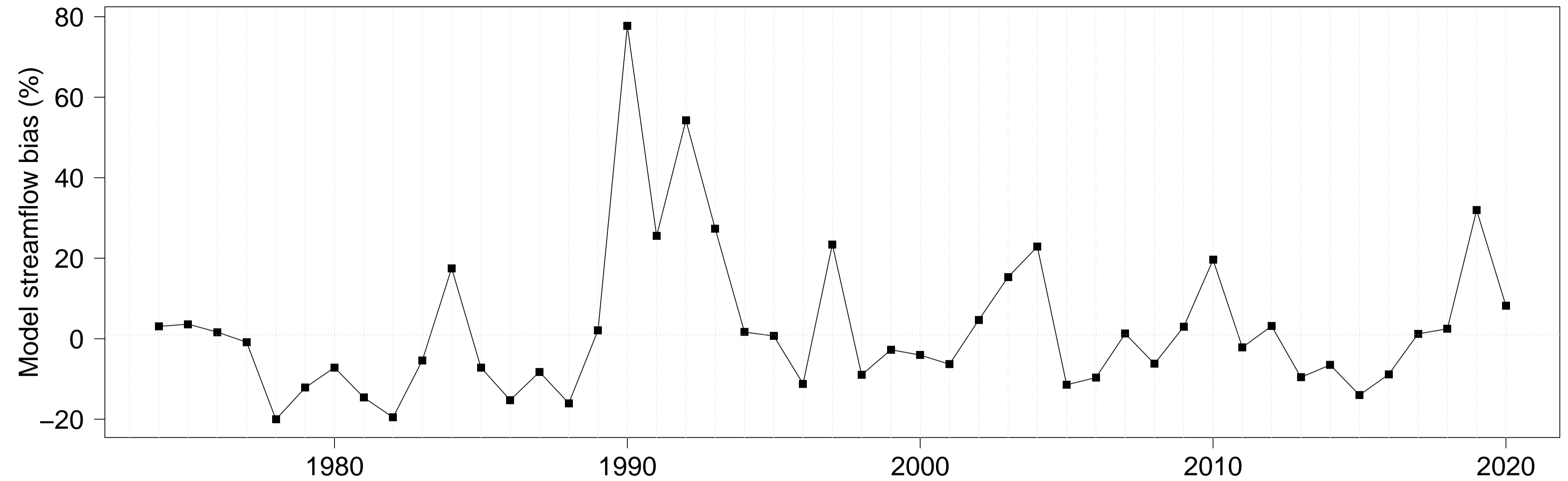


Figure 3. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment H2342020

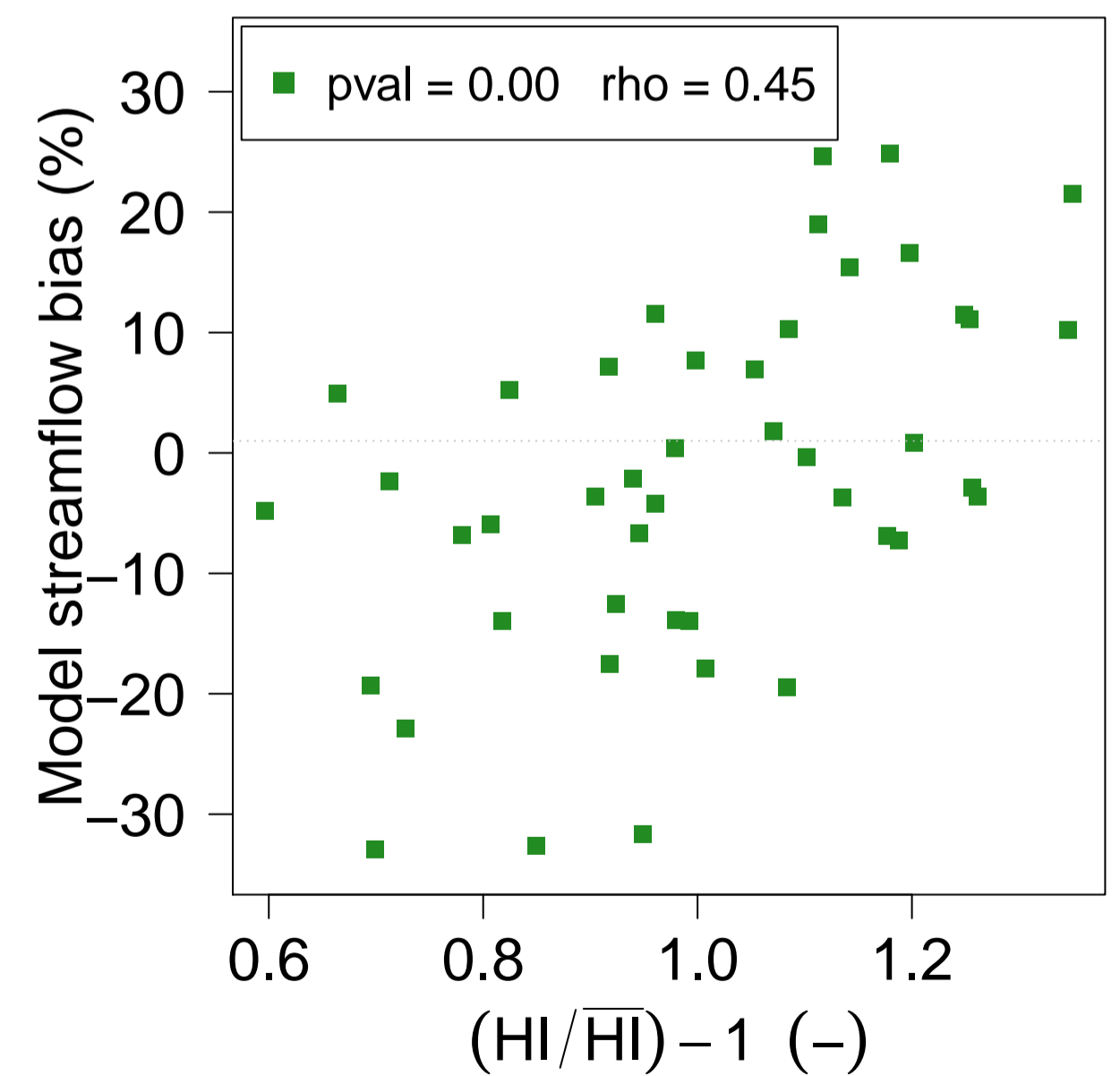
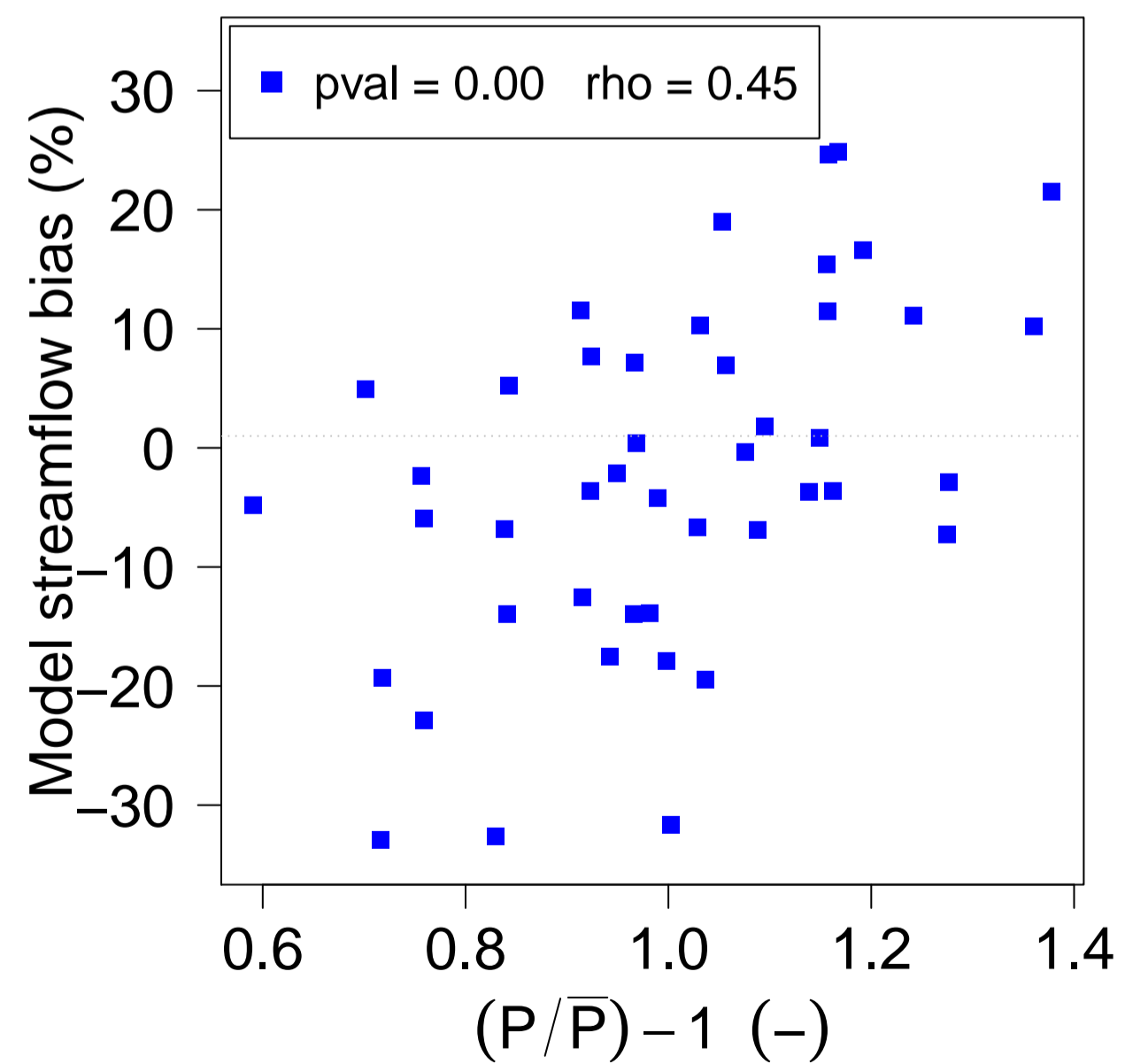
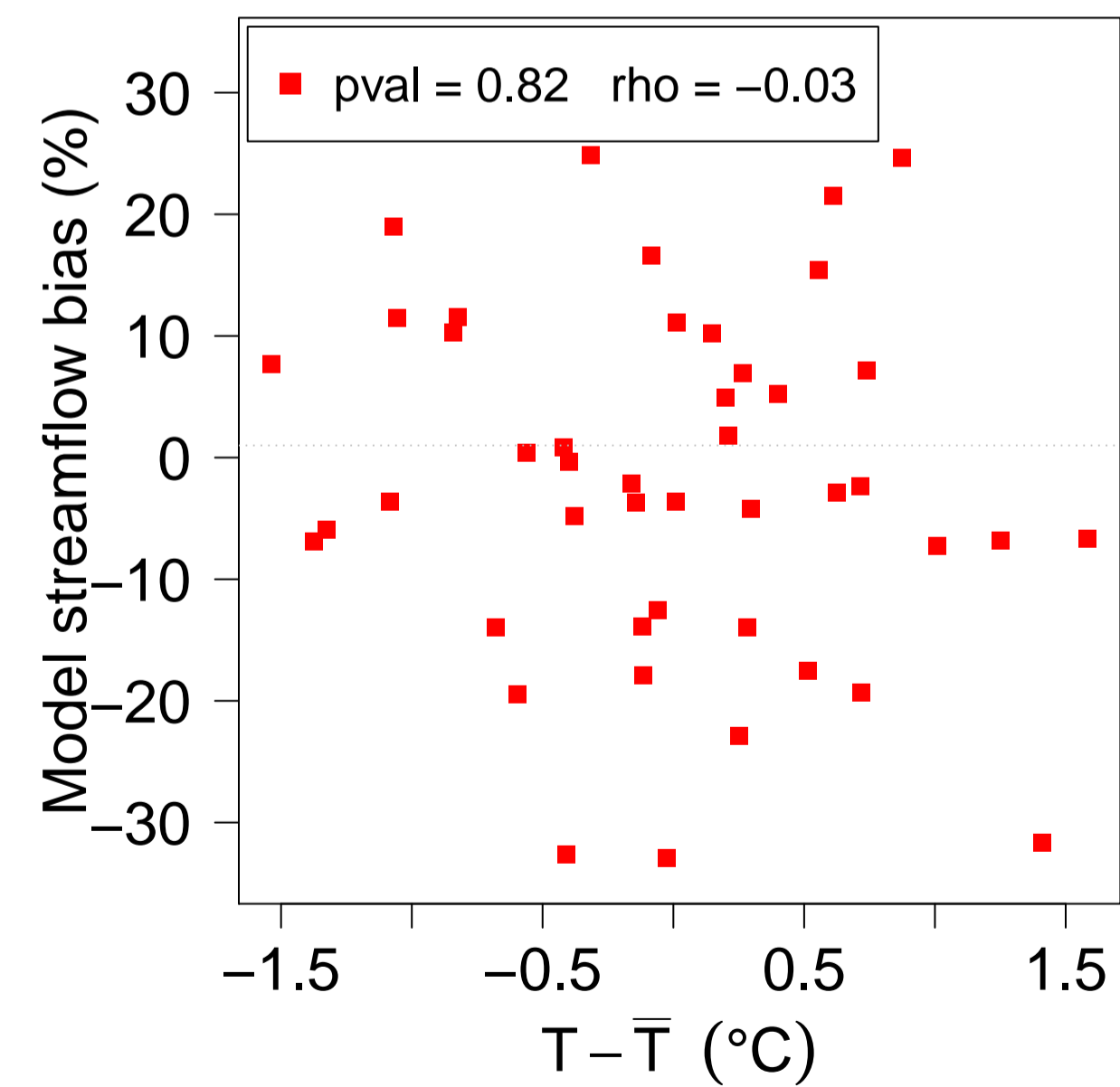
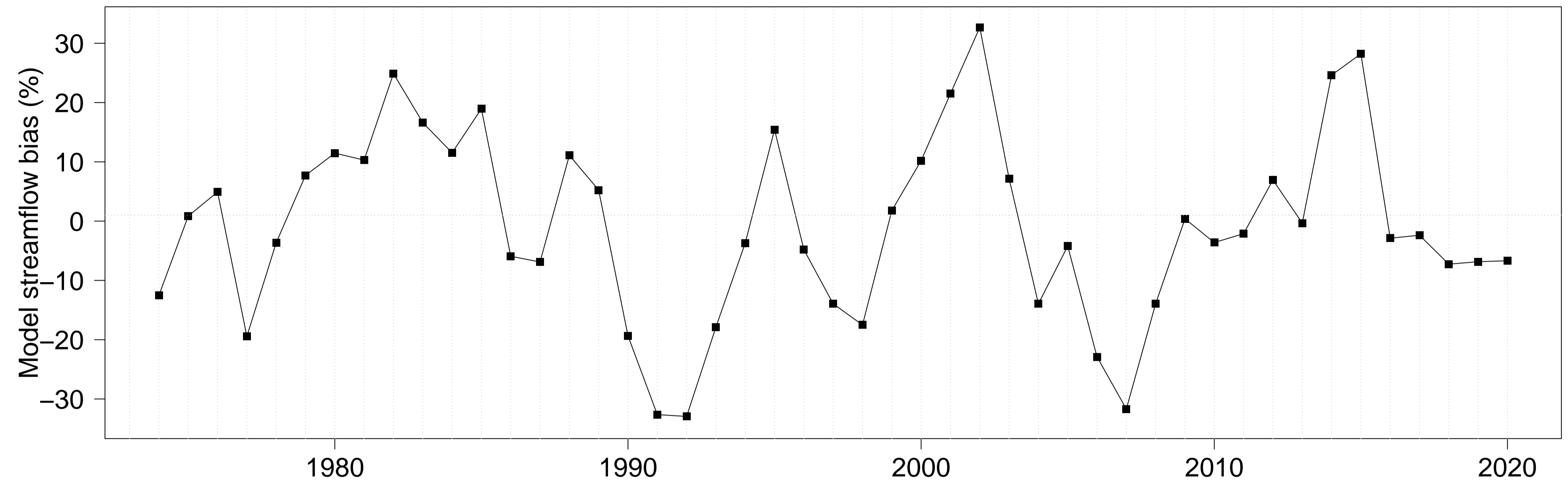


Figure 4. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment H4252010

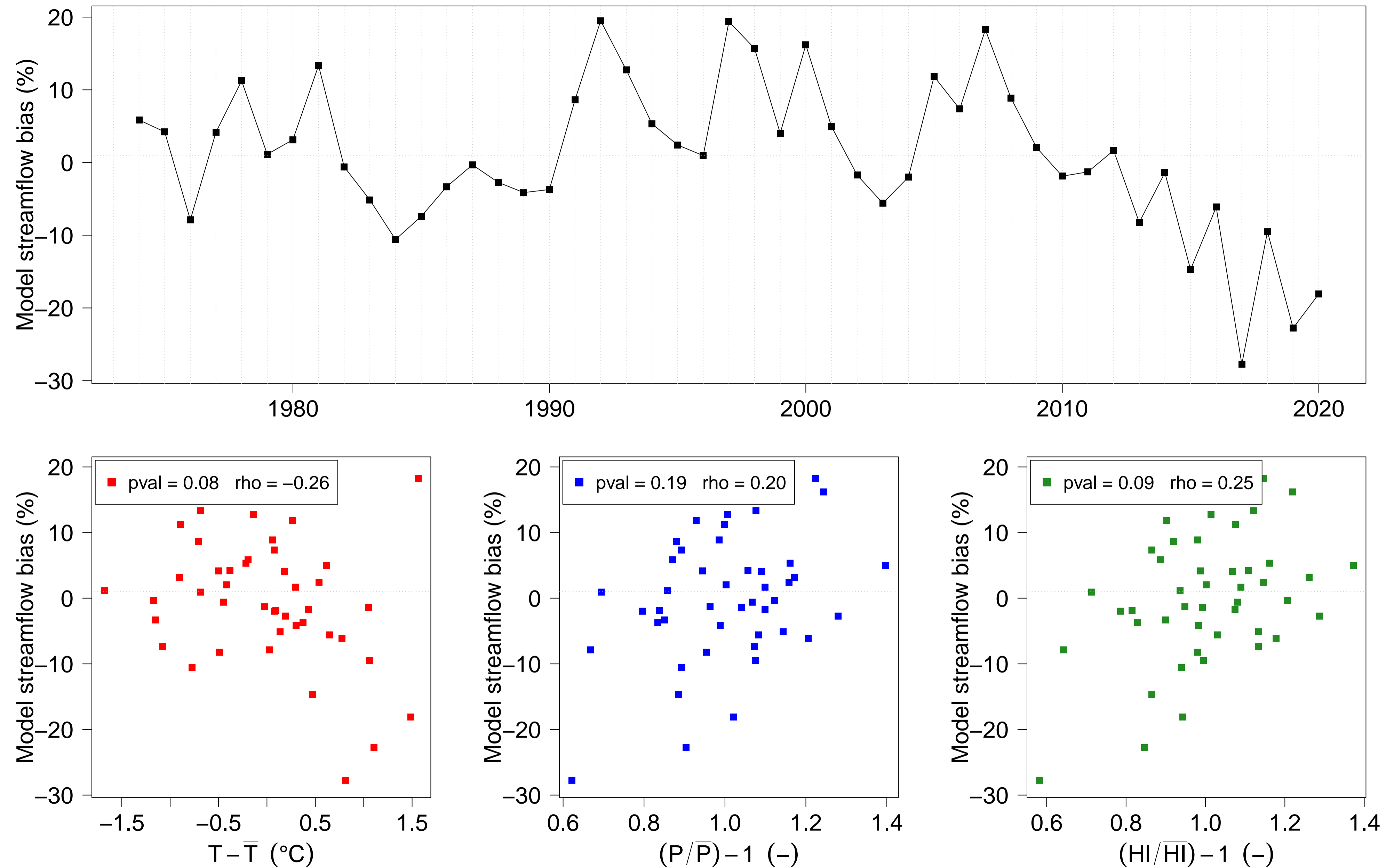


Figure 5. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment H7401010

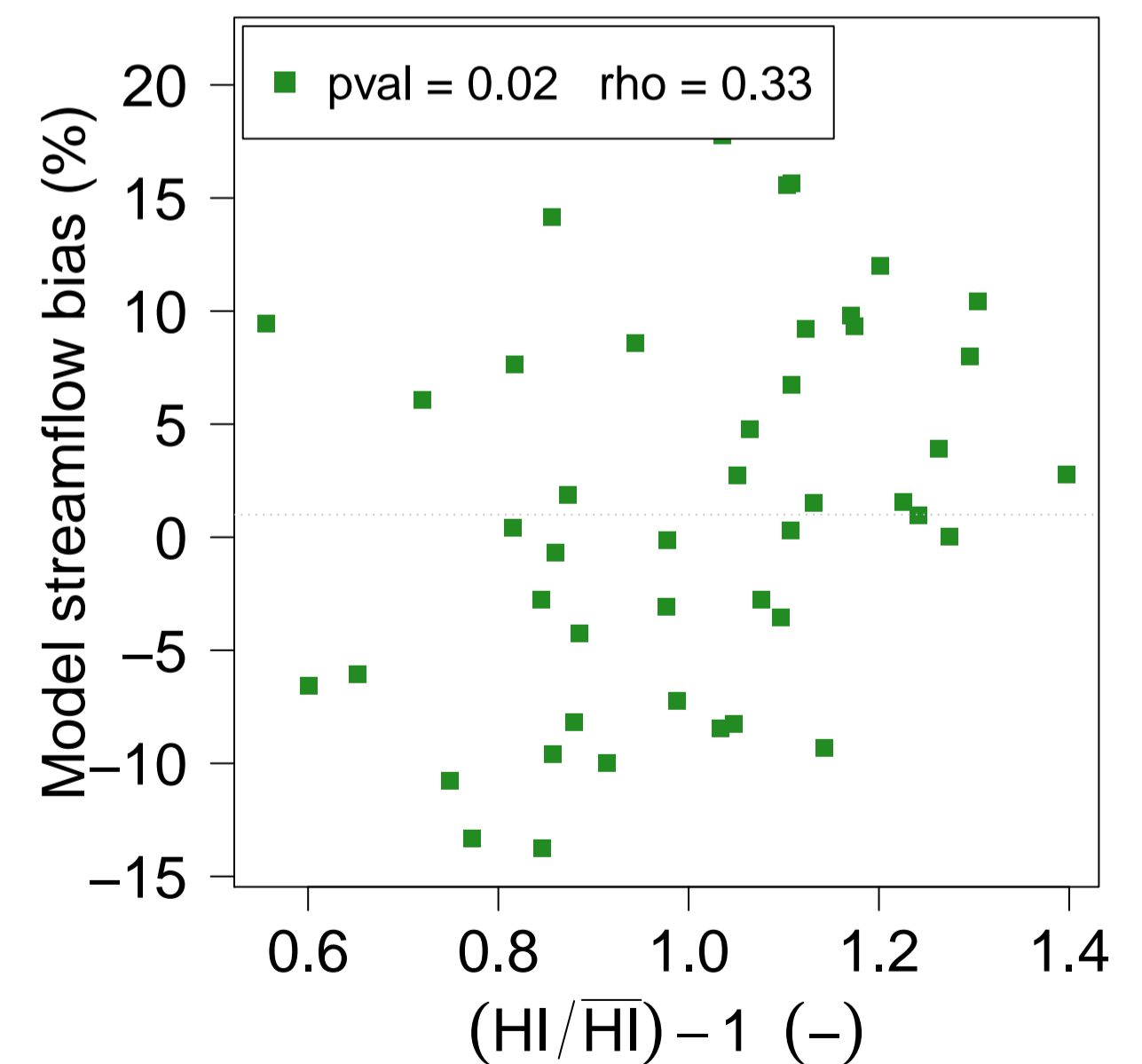
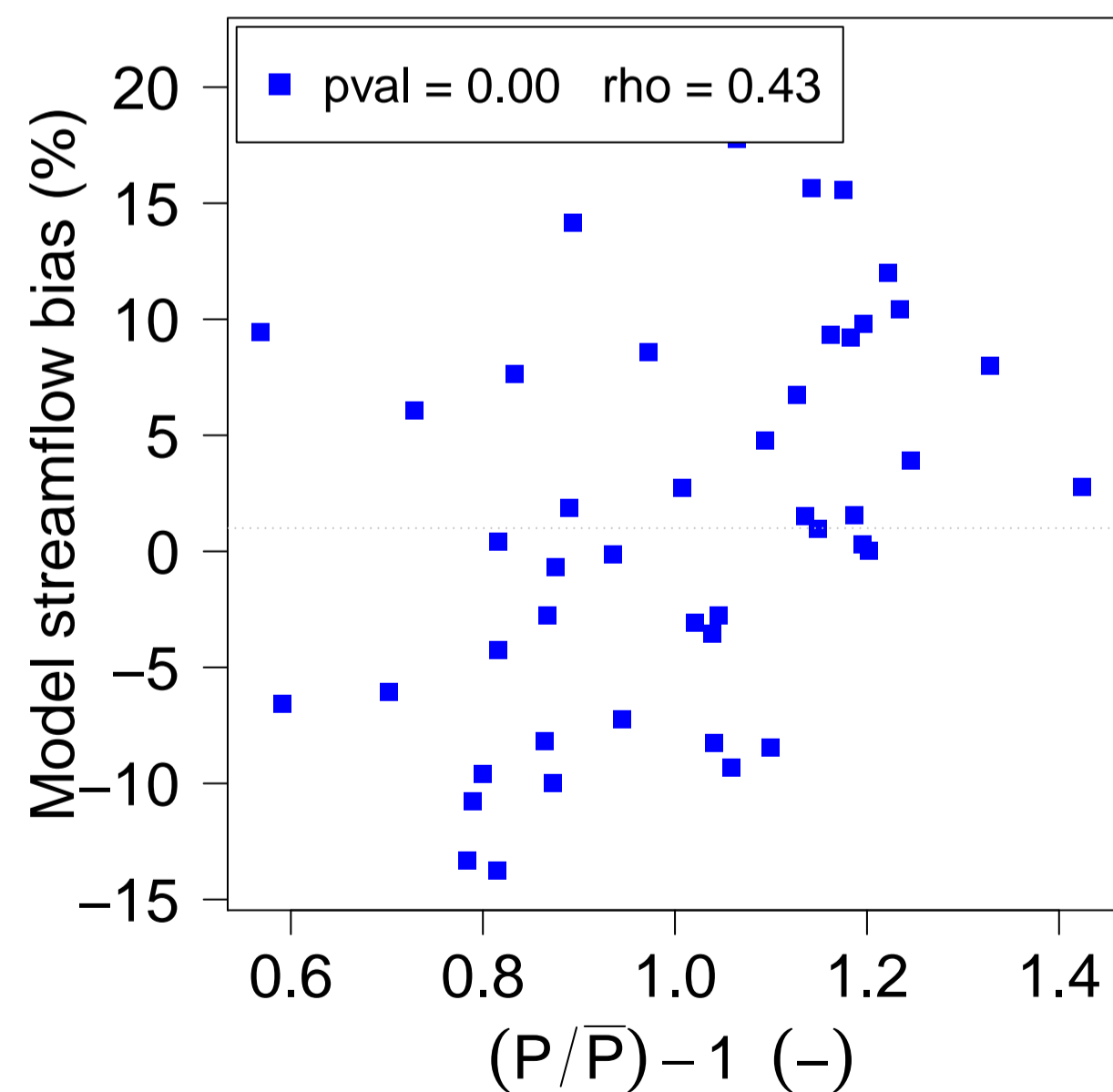
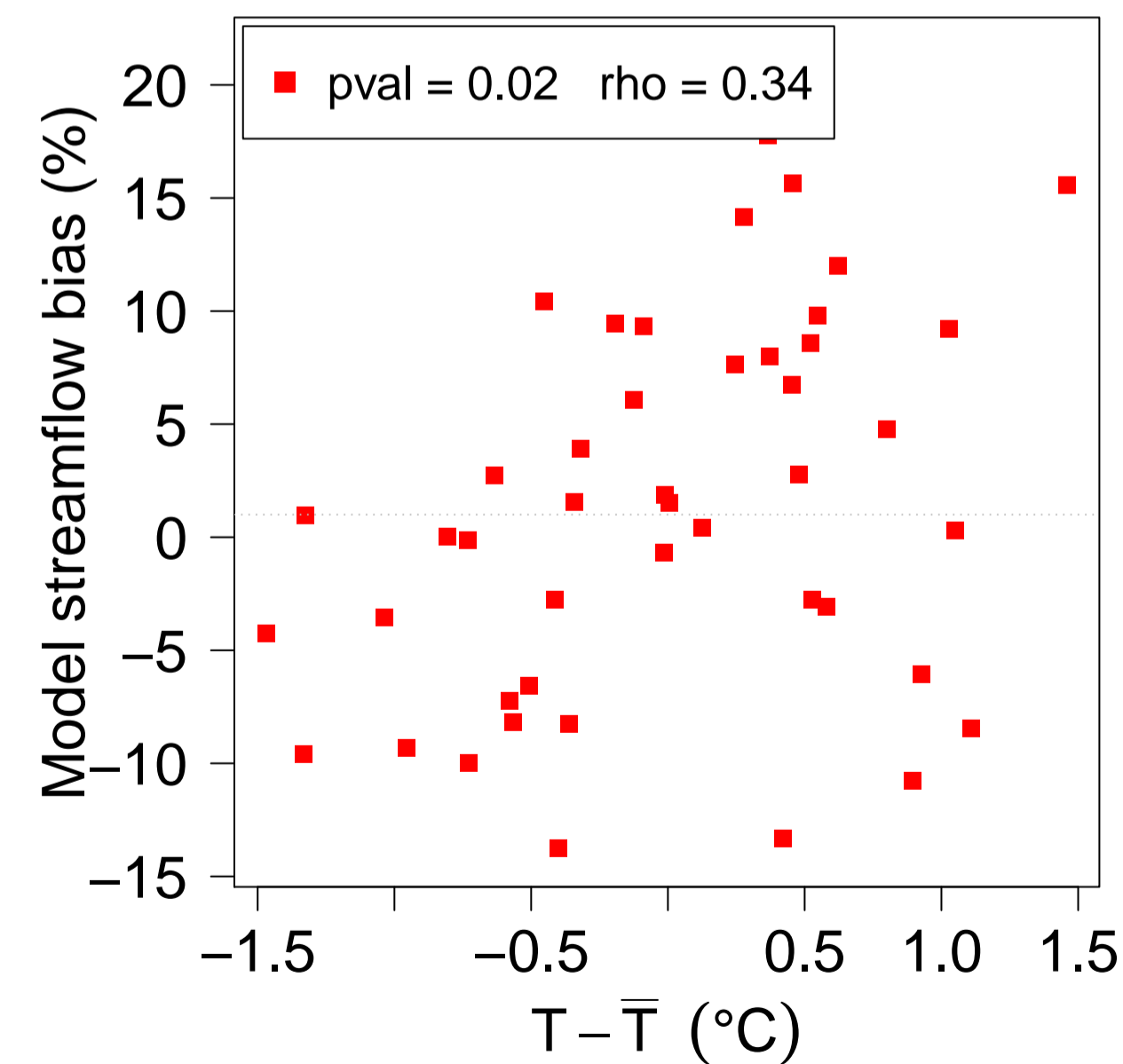
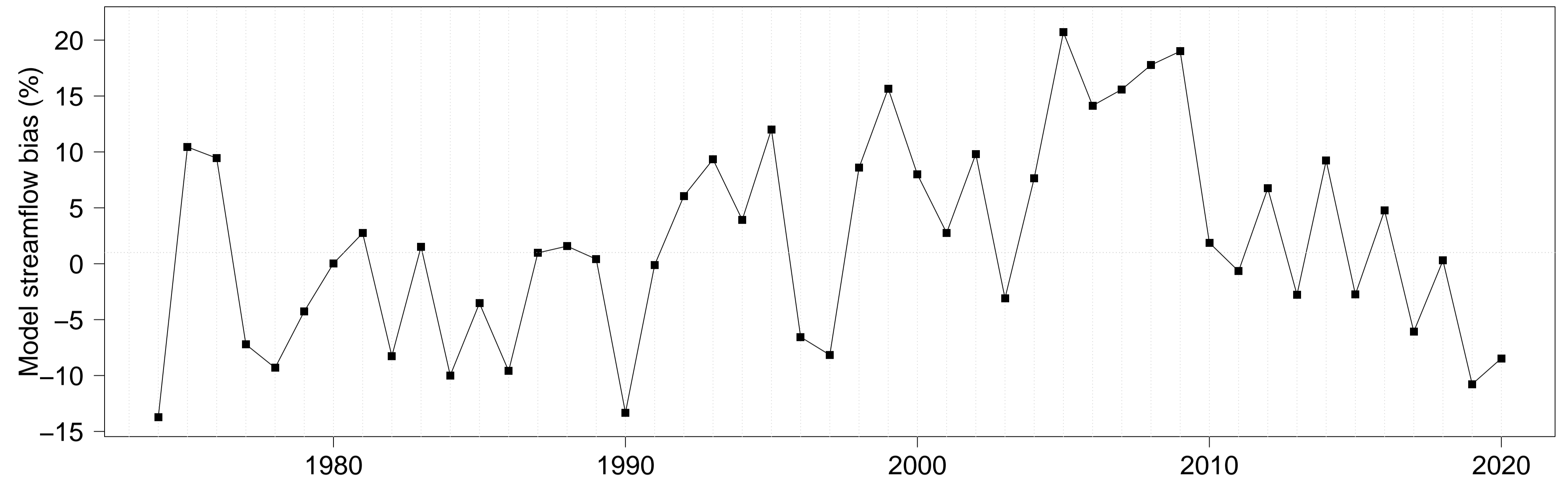


Figure 6. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment H8212010

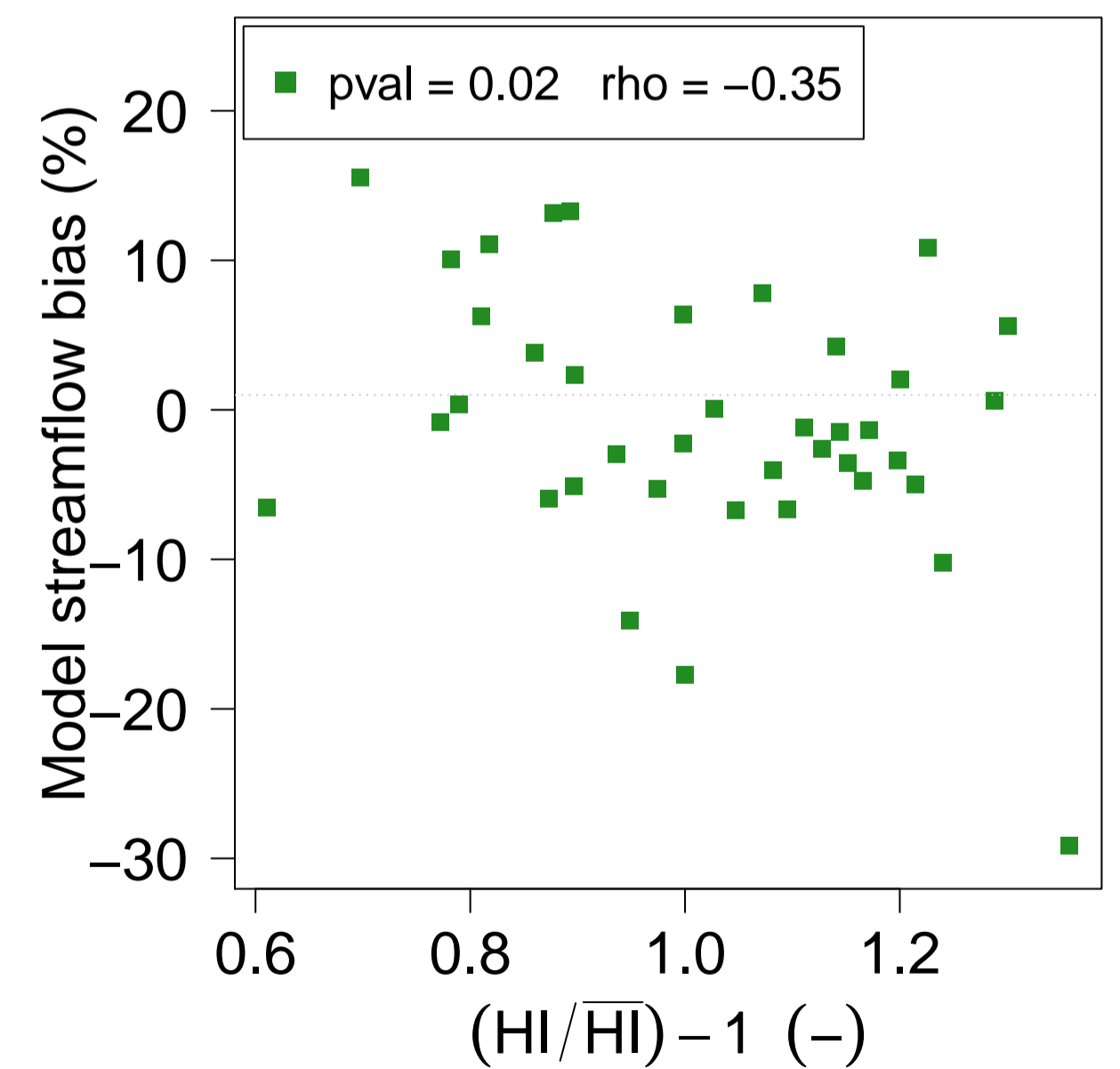
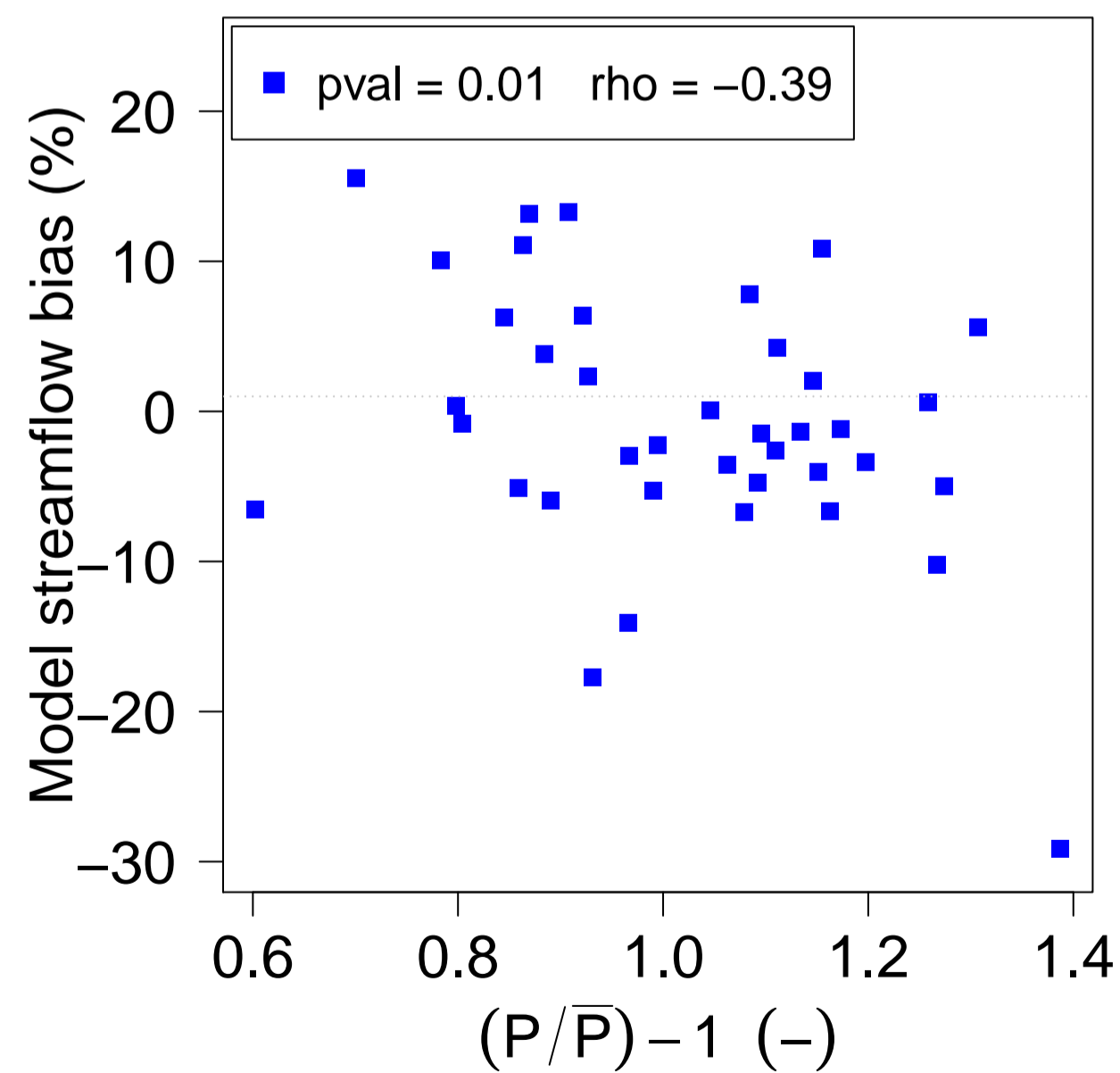
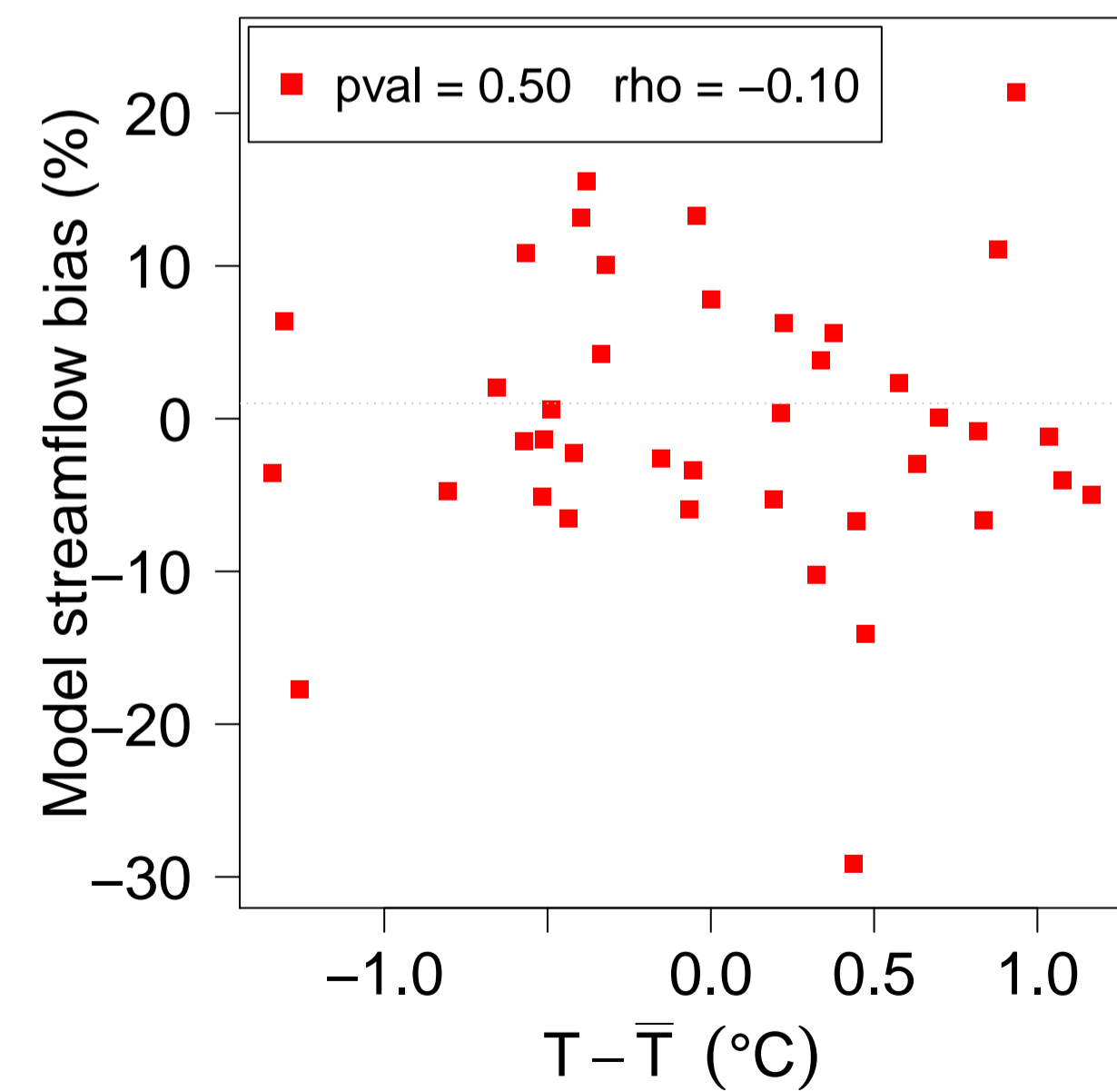
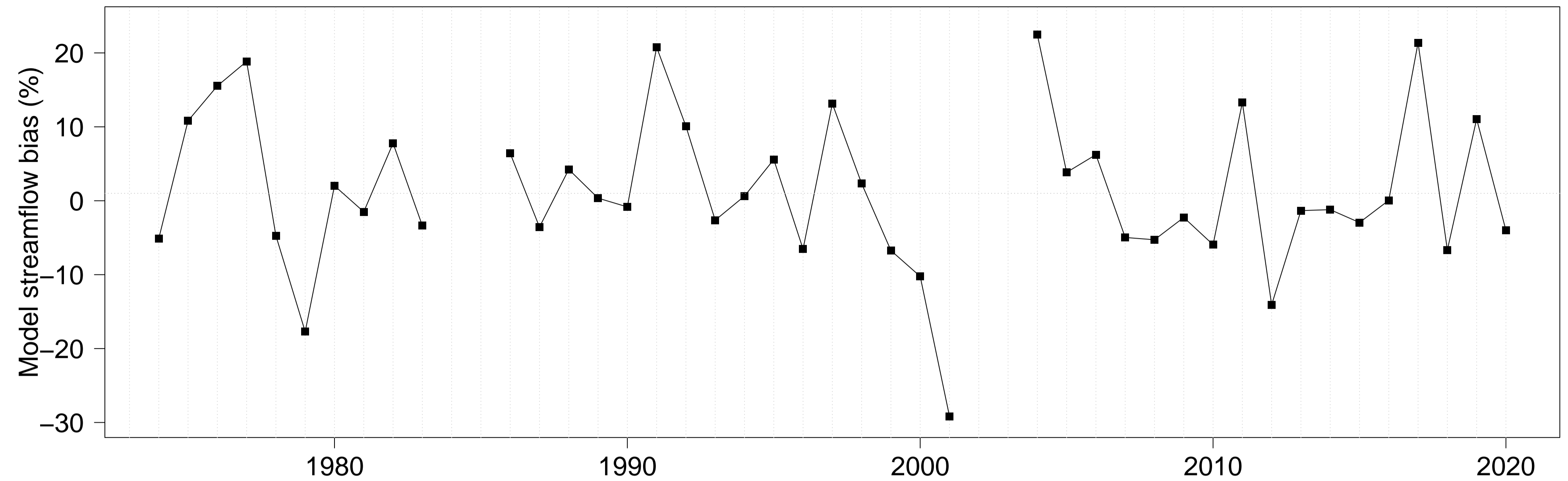


Figure 7. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment I5221010

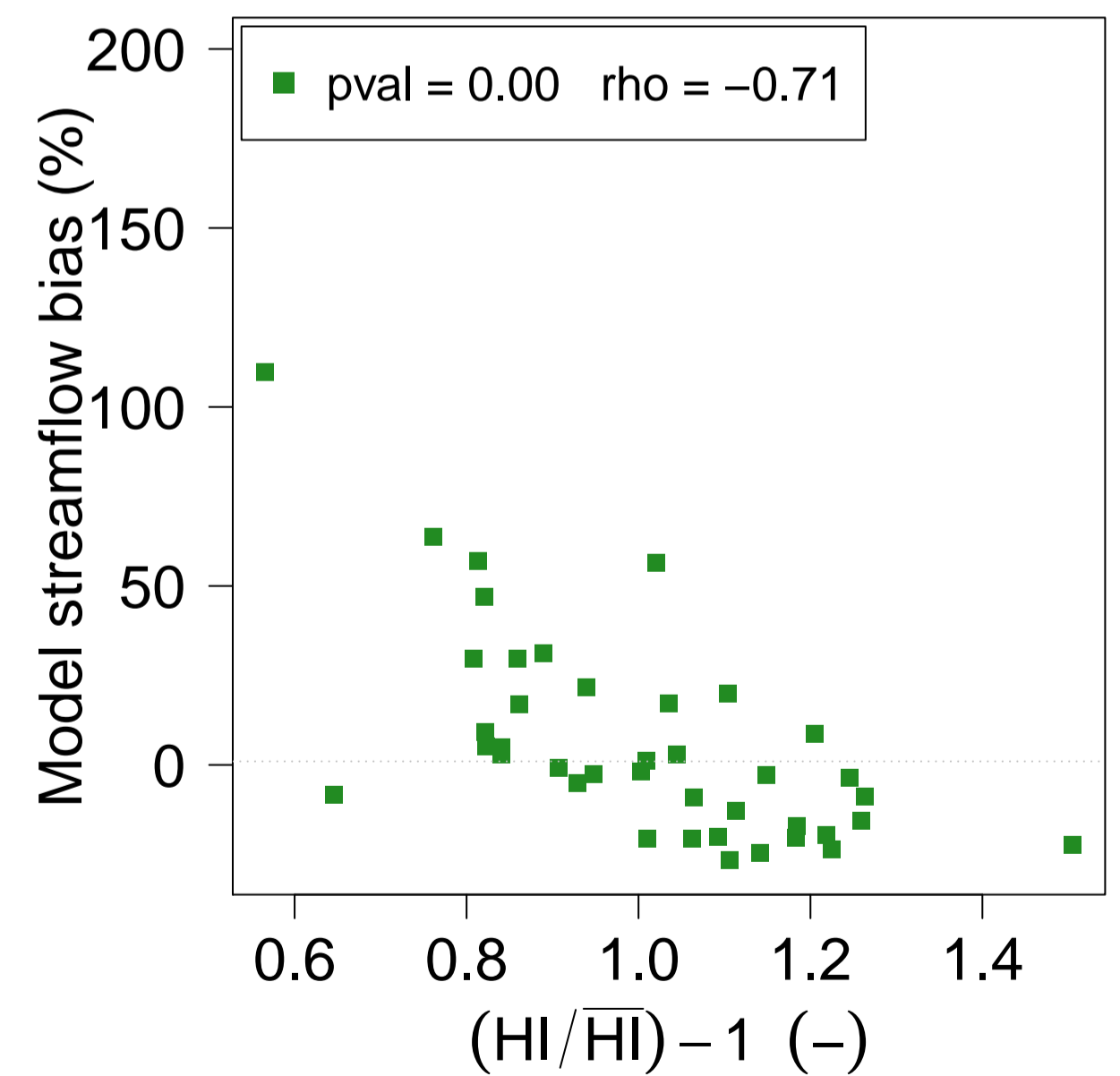
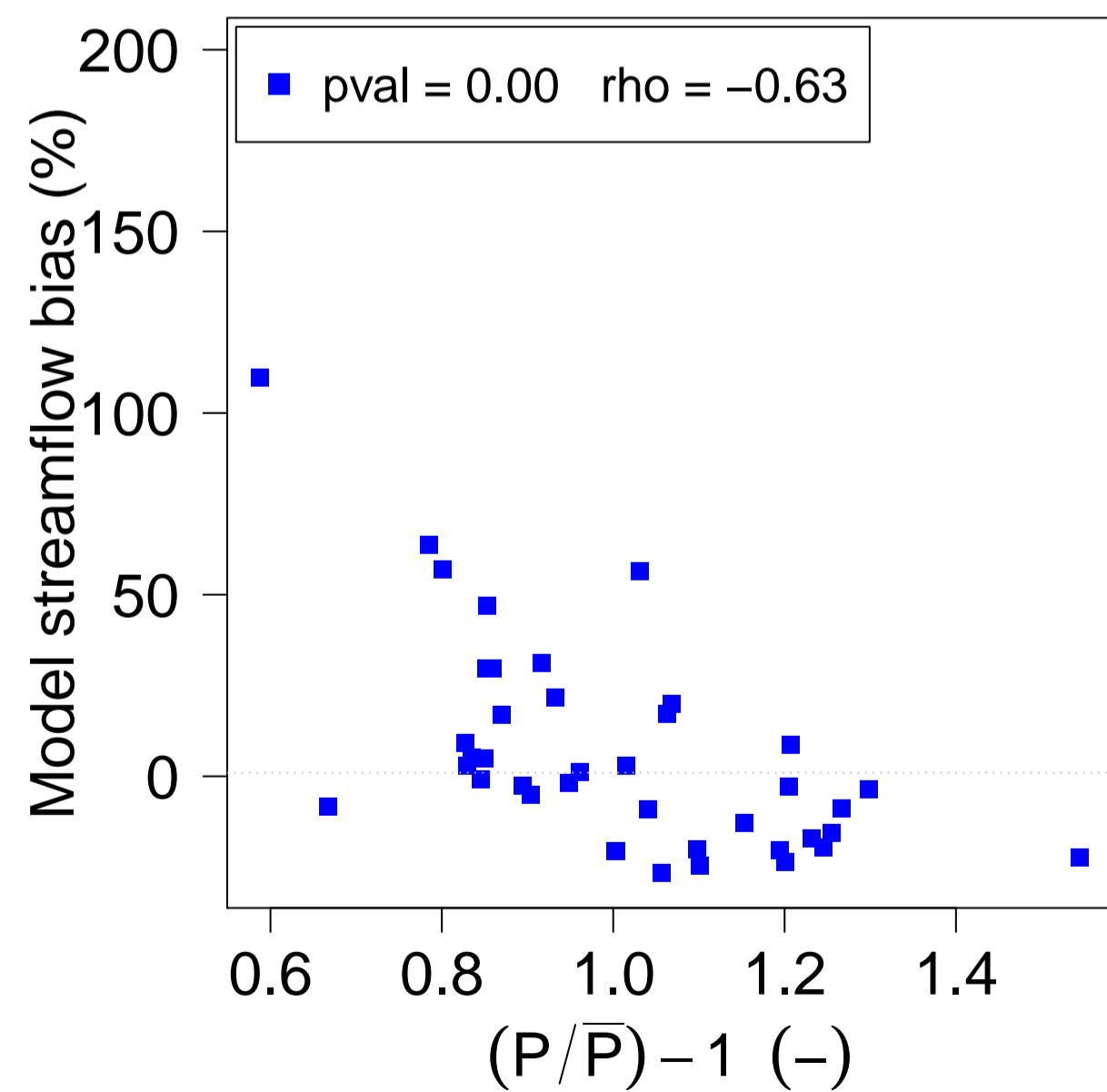
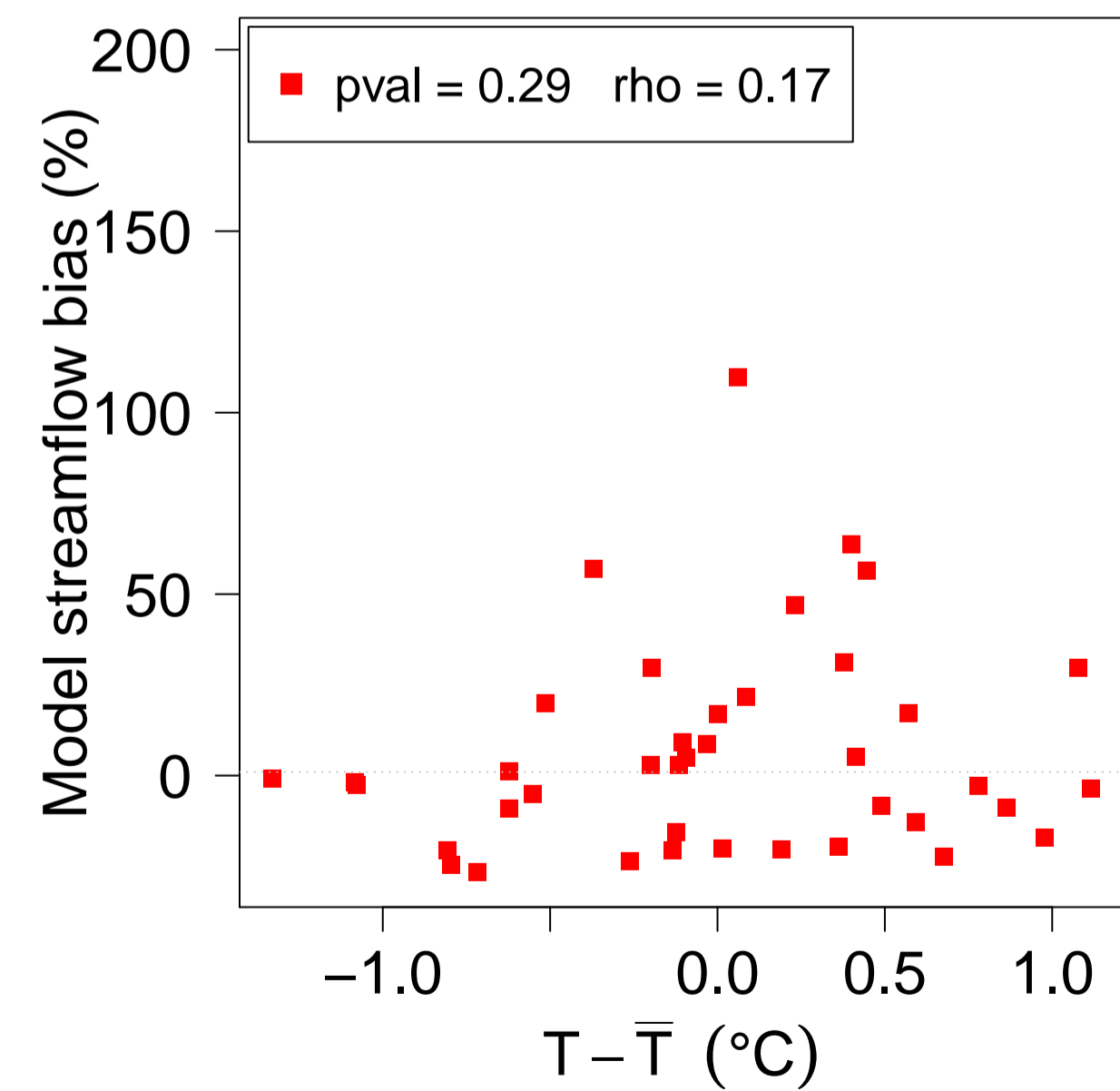
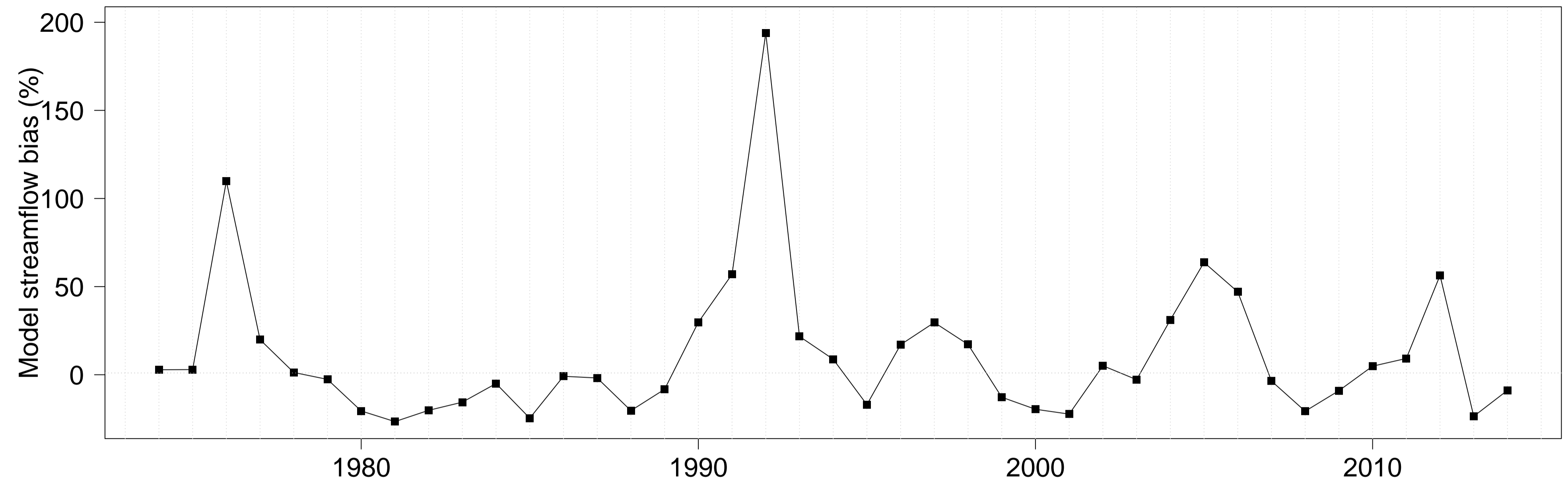


Figure 8. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment J7483010

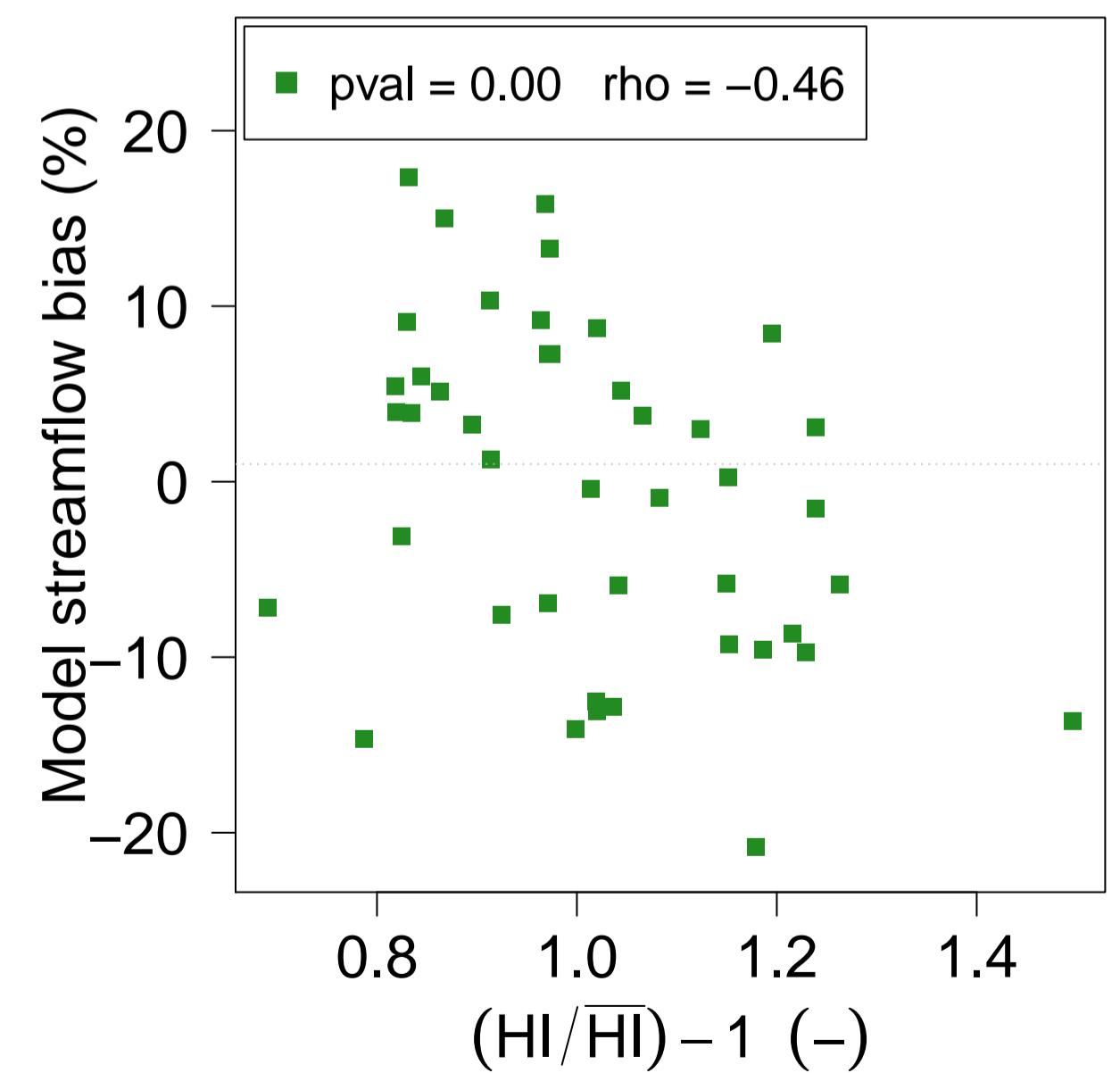
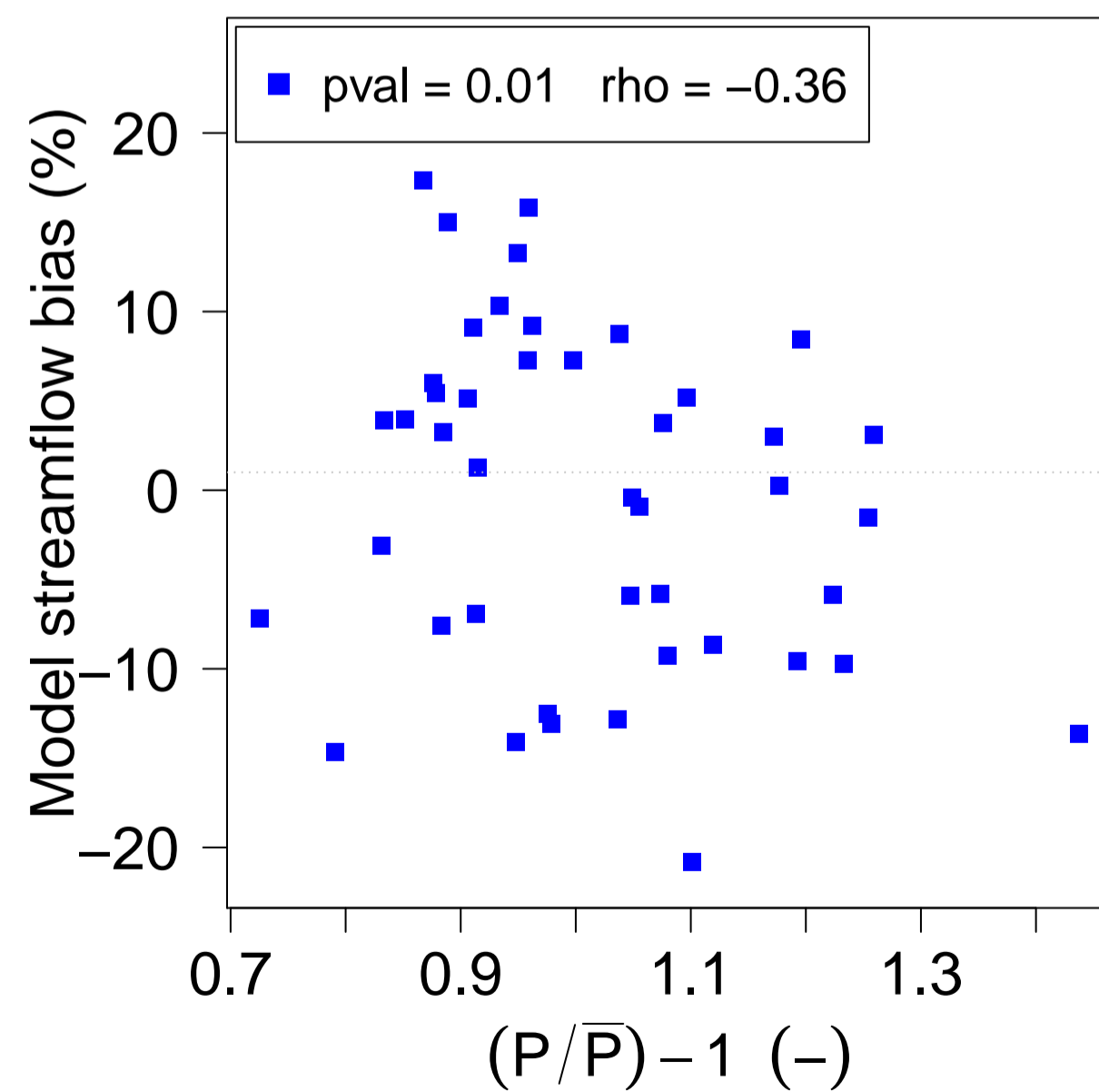
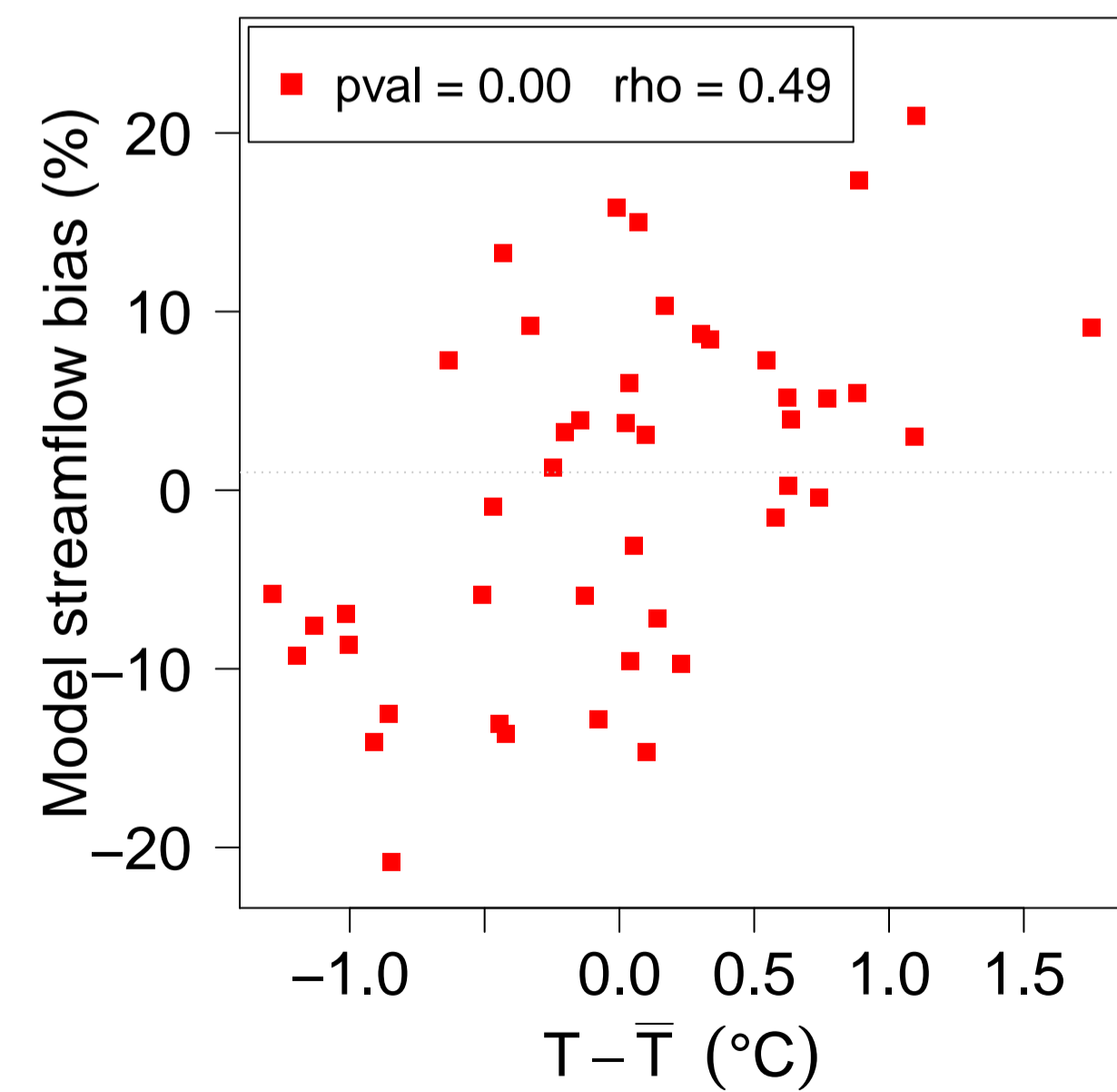
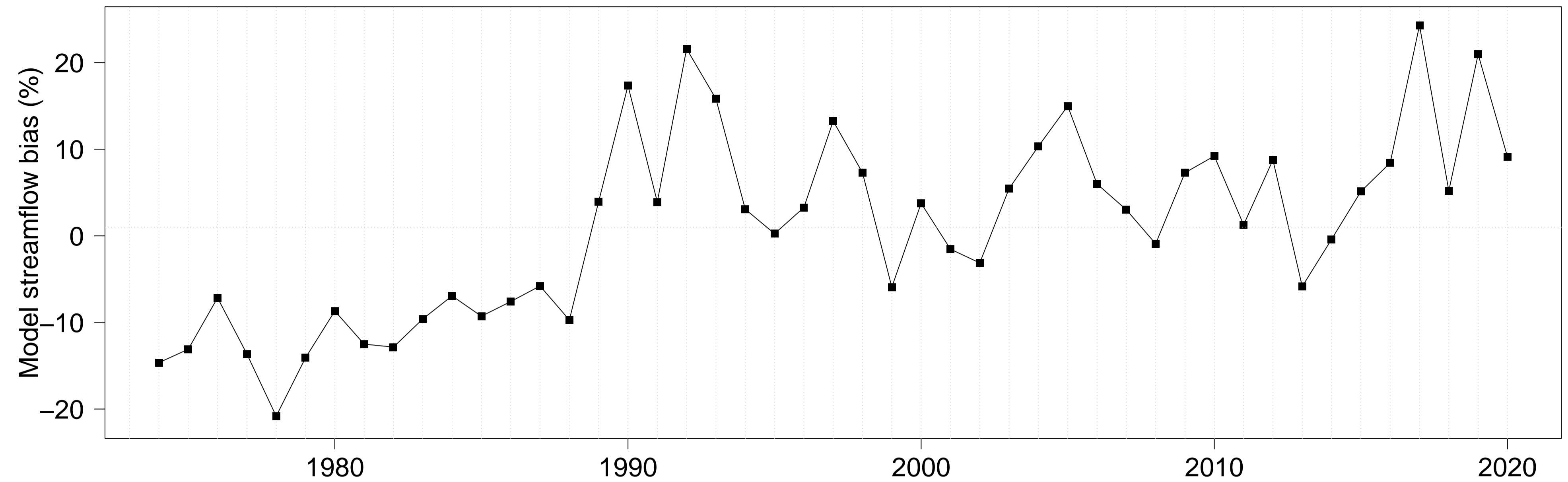


Figure 9. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment K1321810

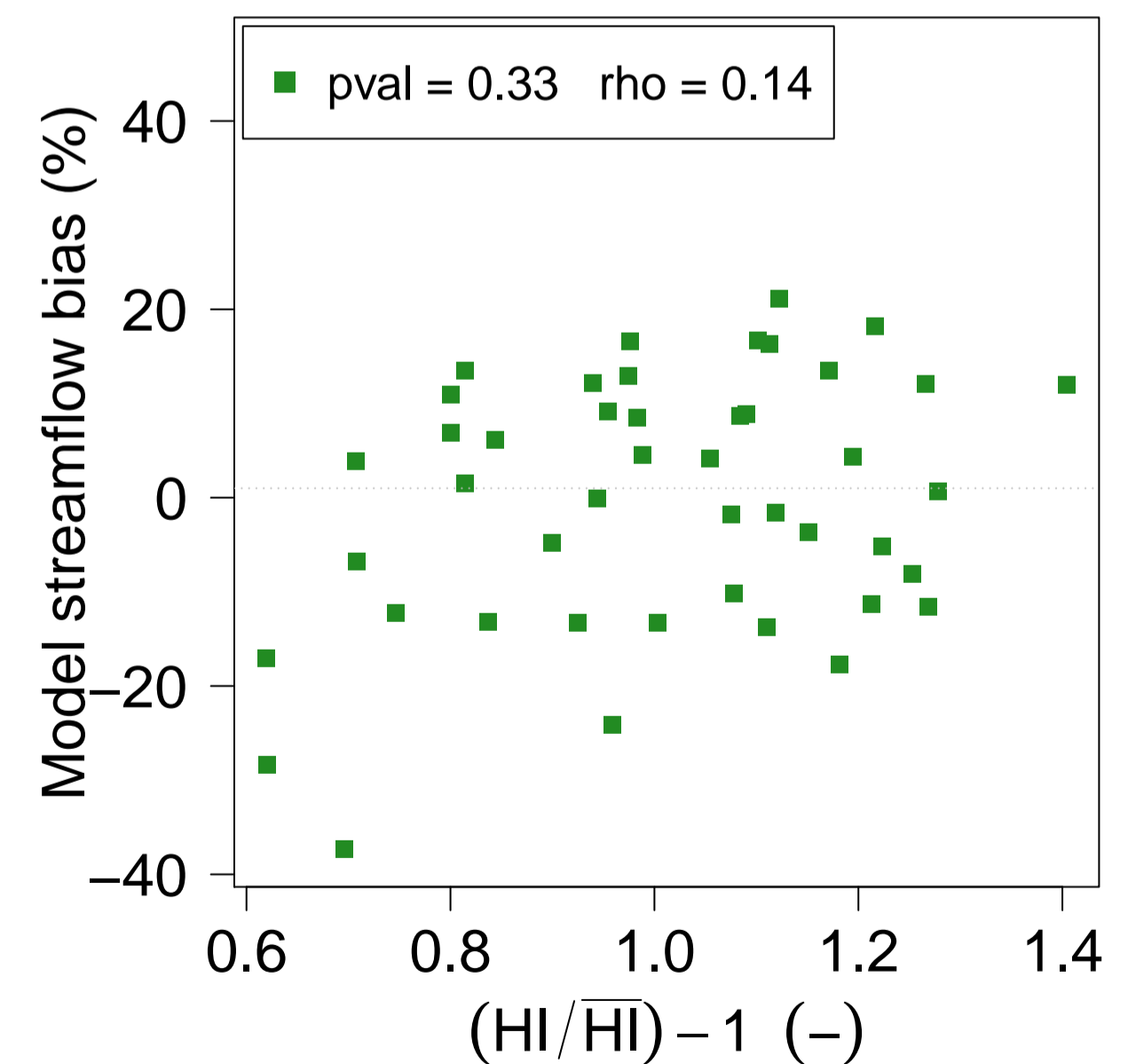
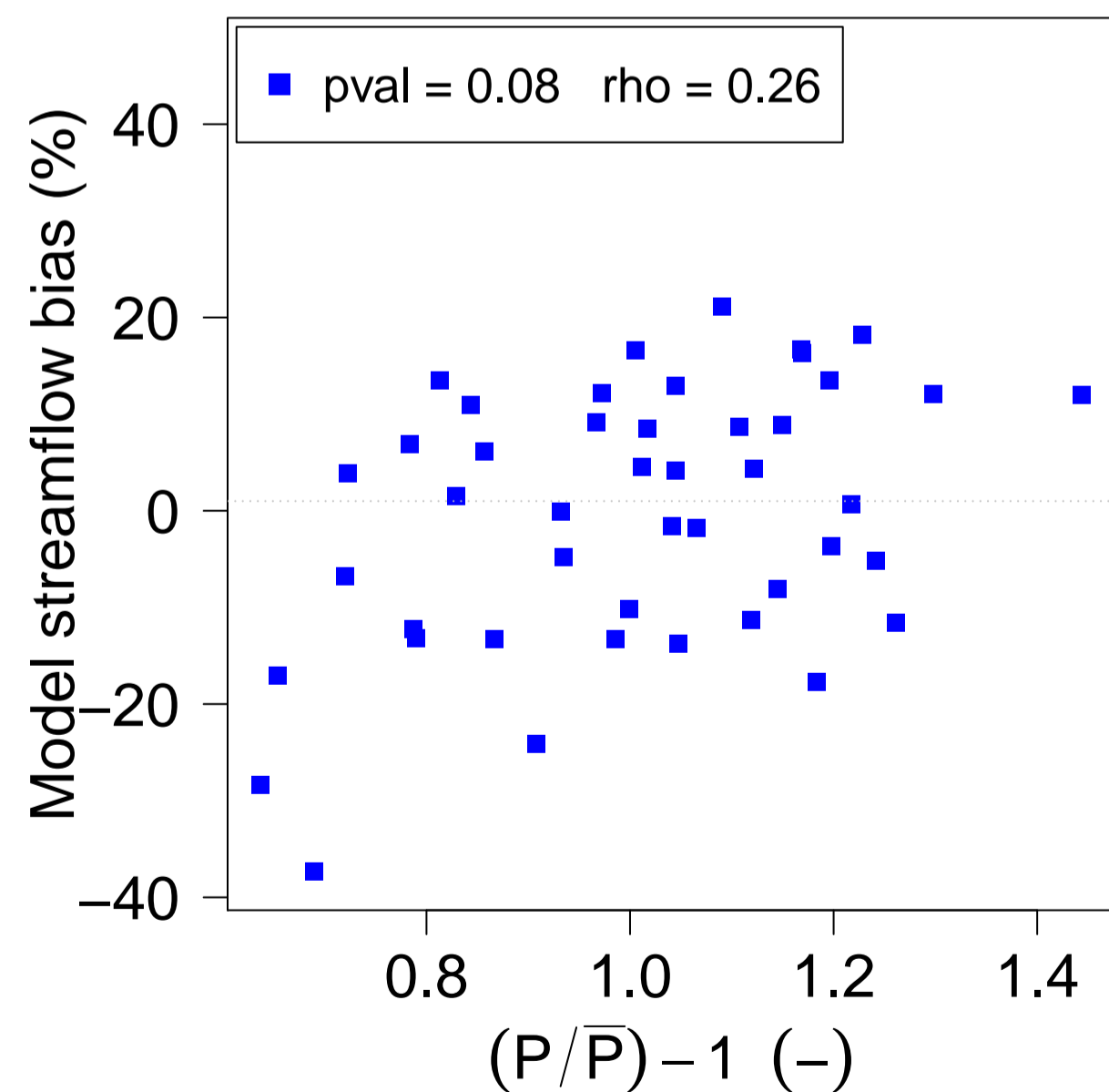
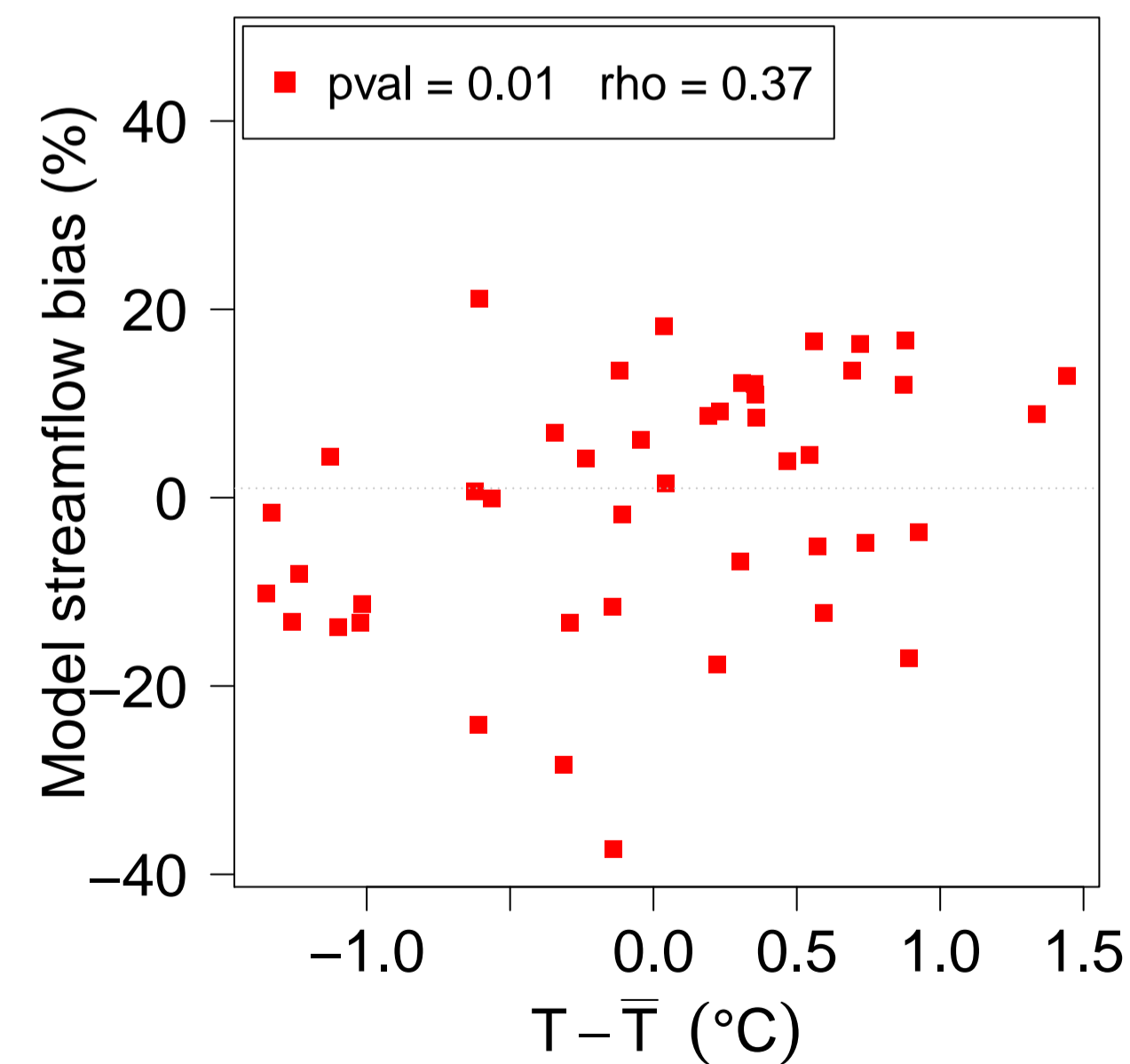
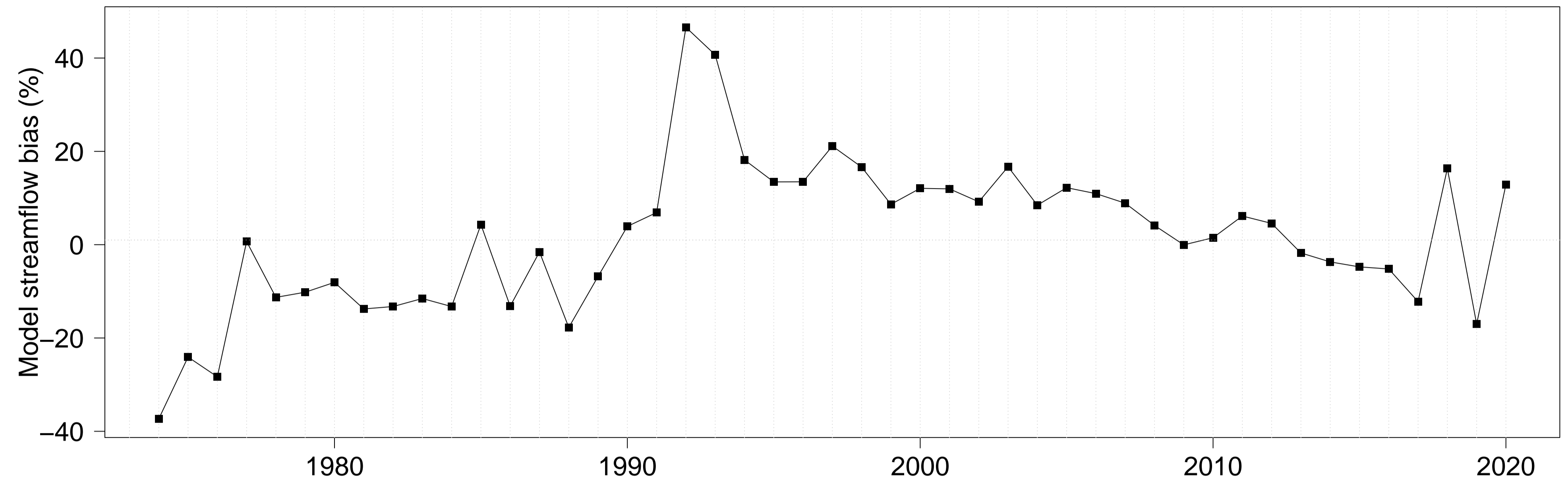


Figure 10. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment K6402520

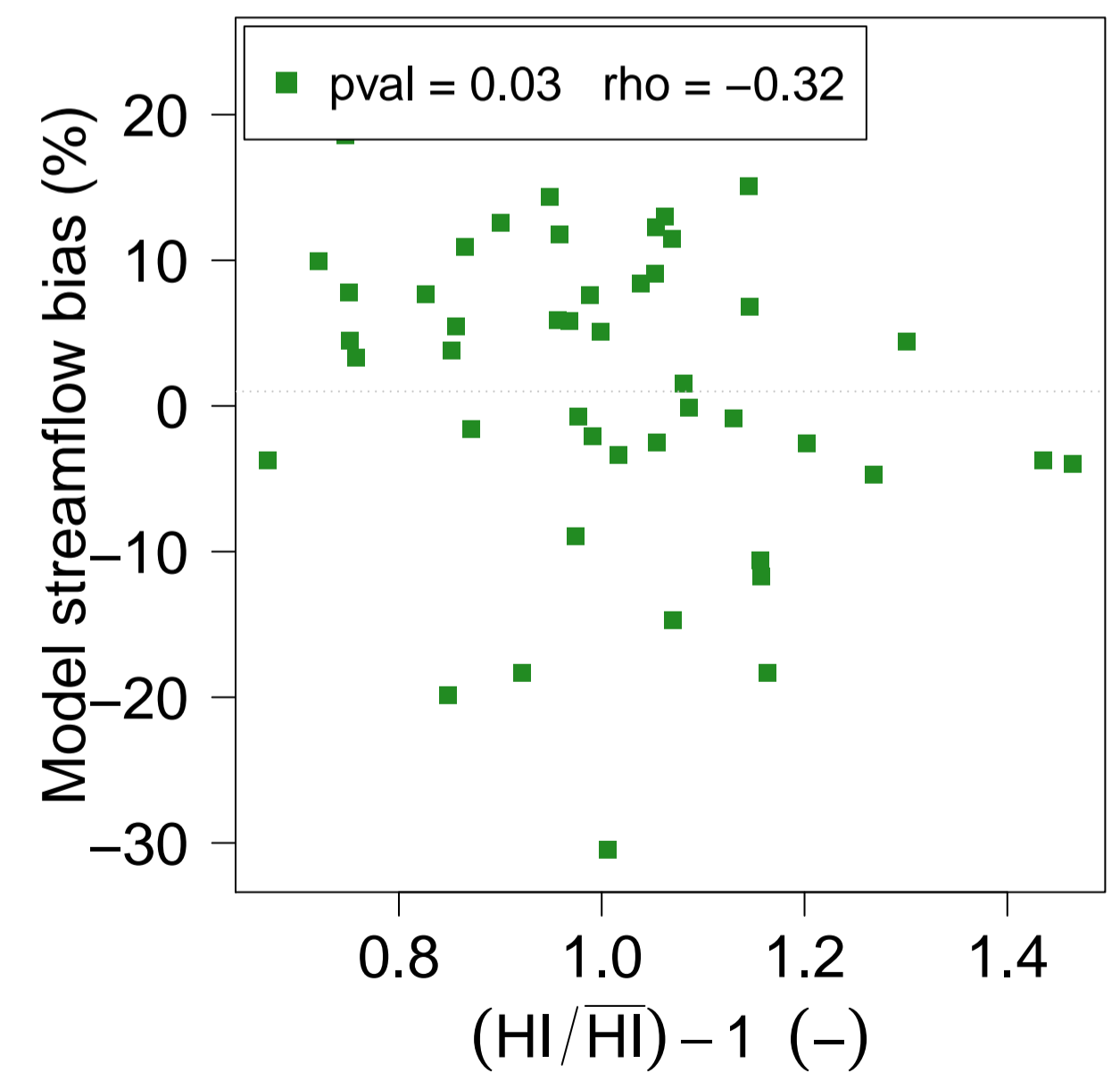
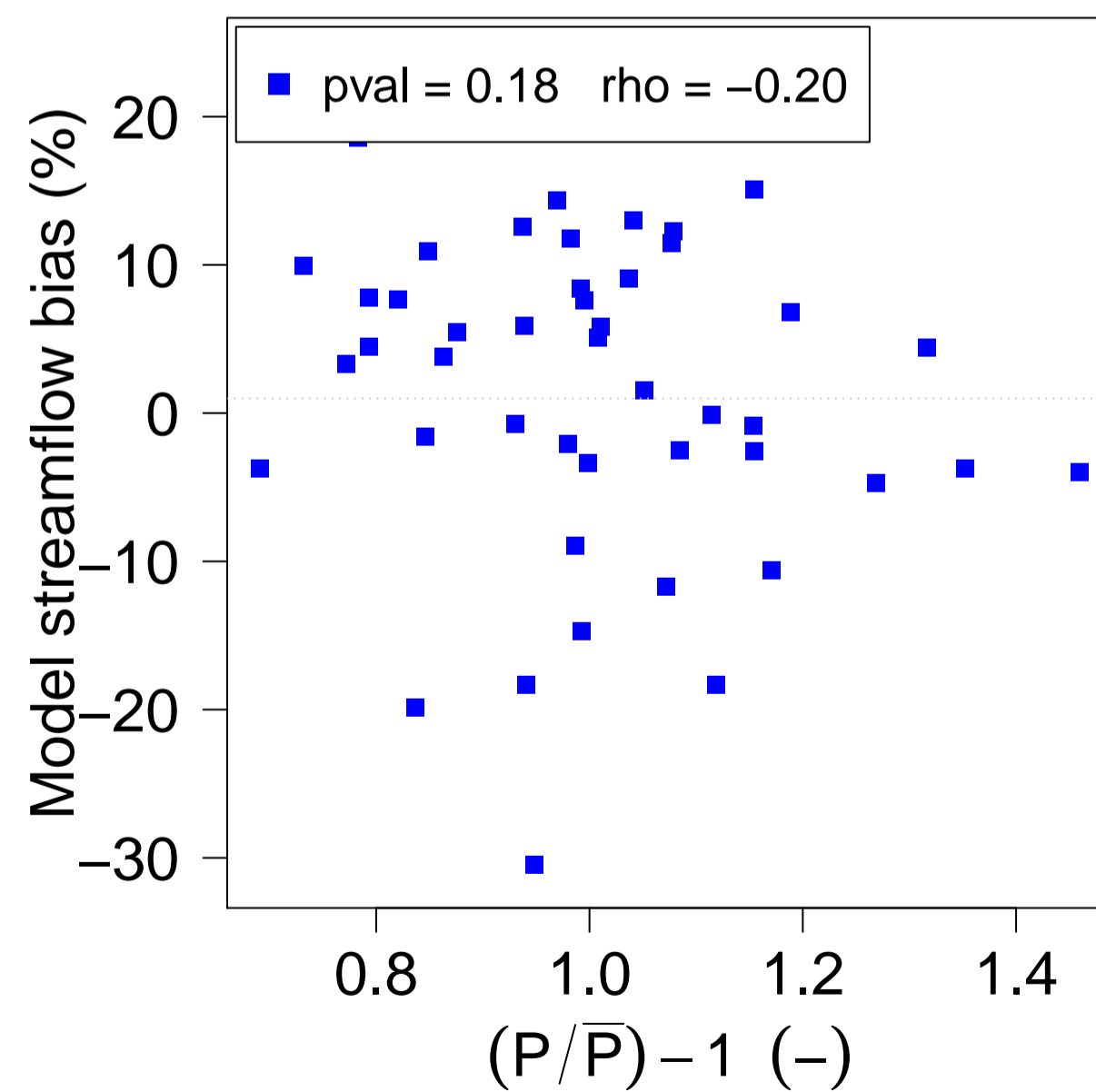
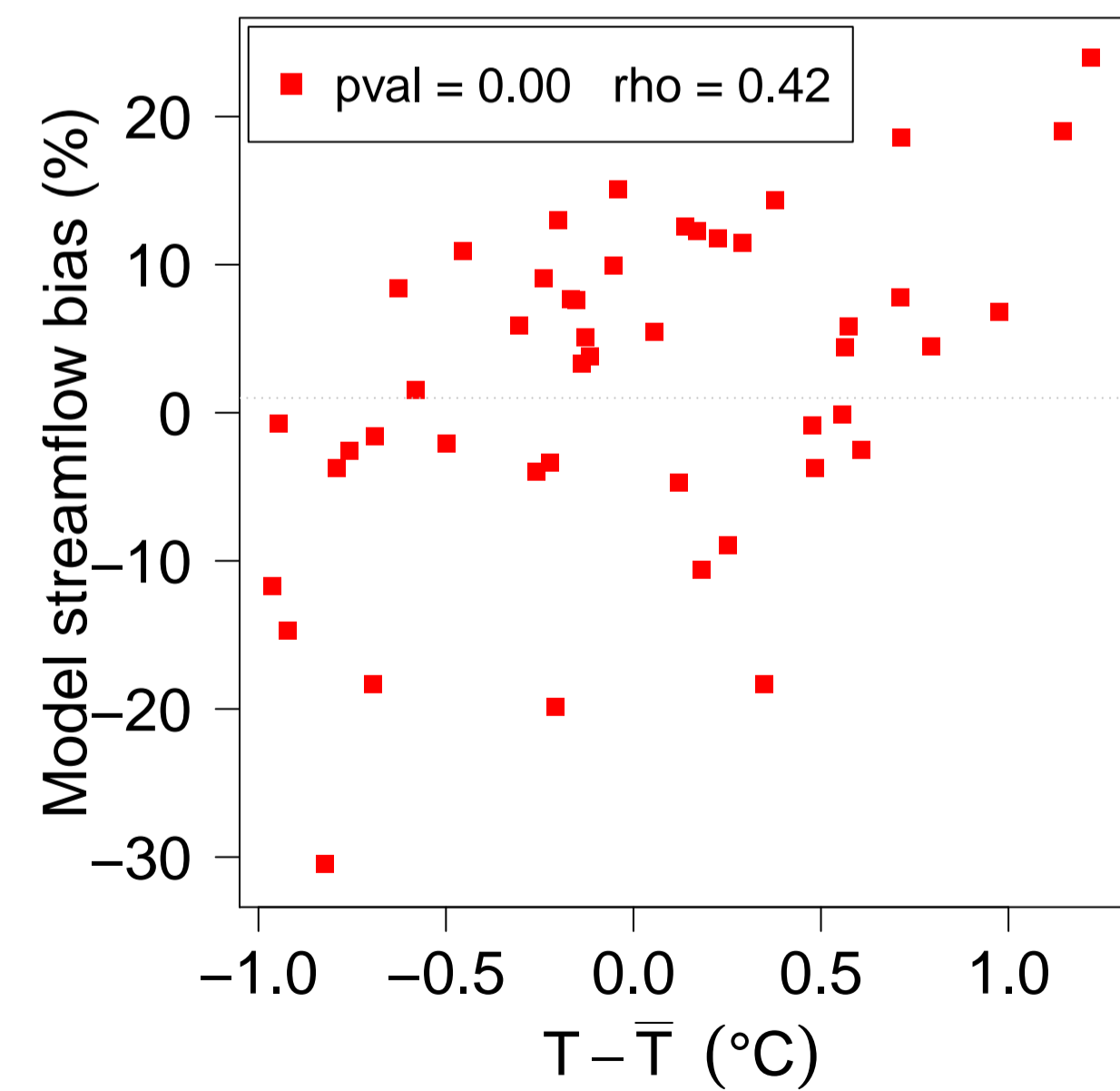
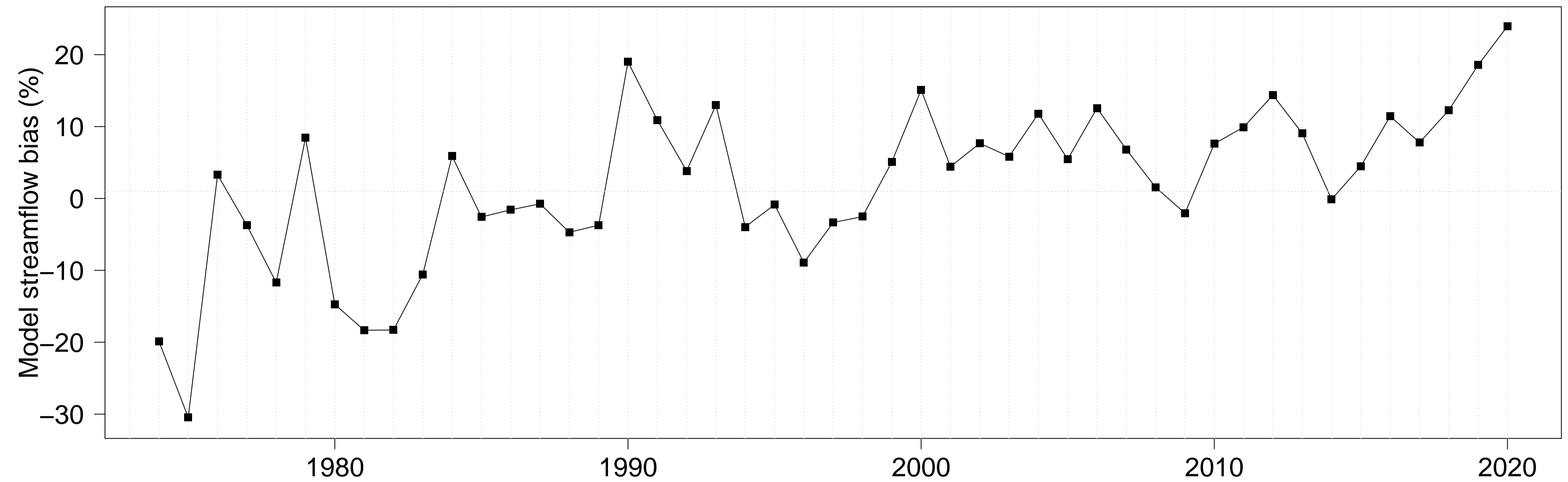


Figure 11. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment L0563010

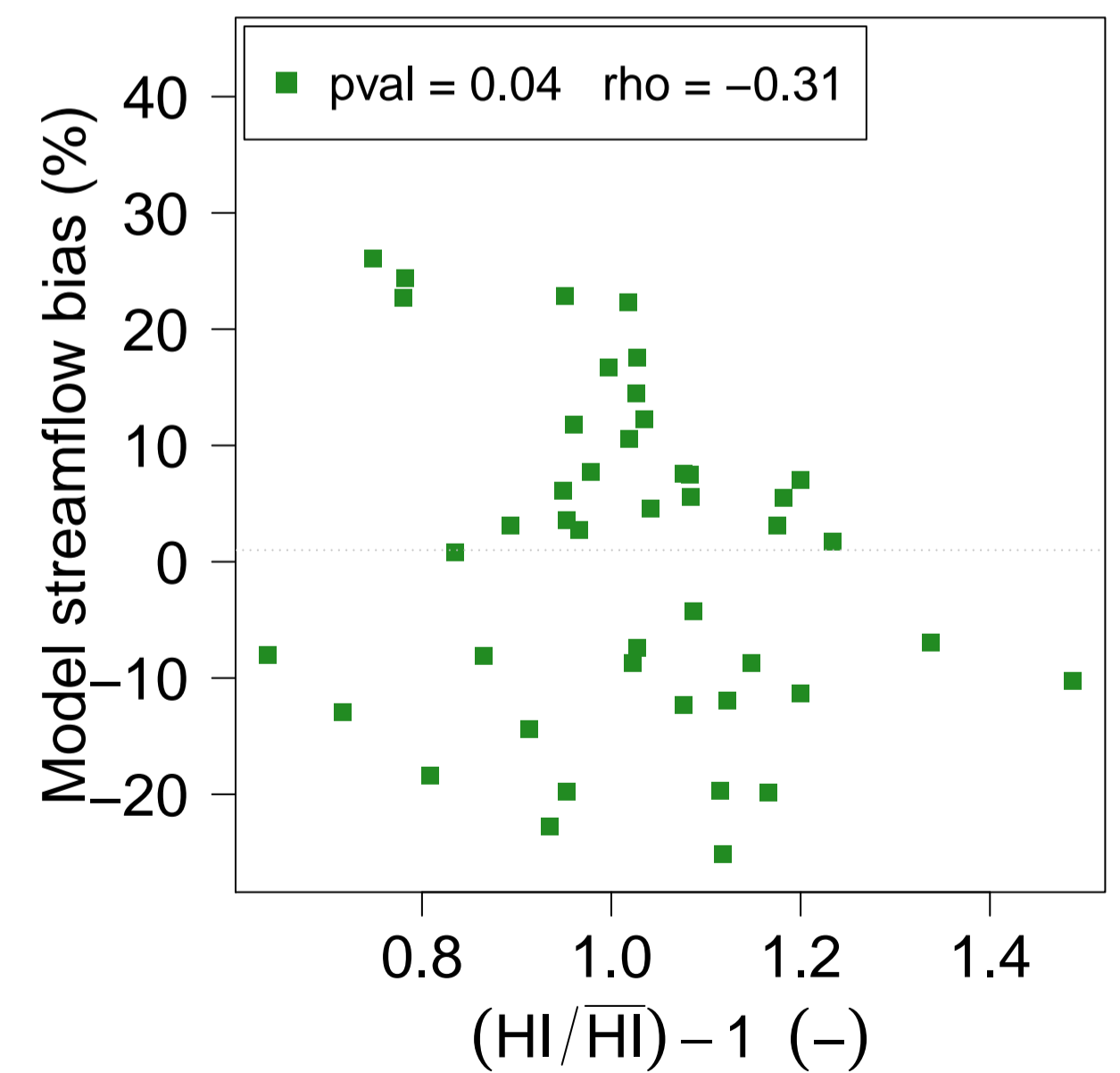
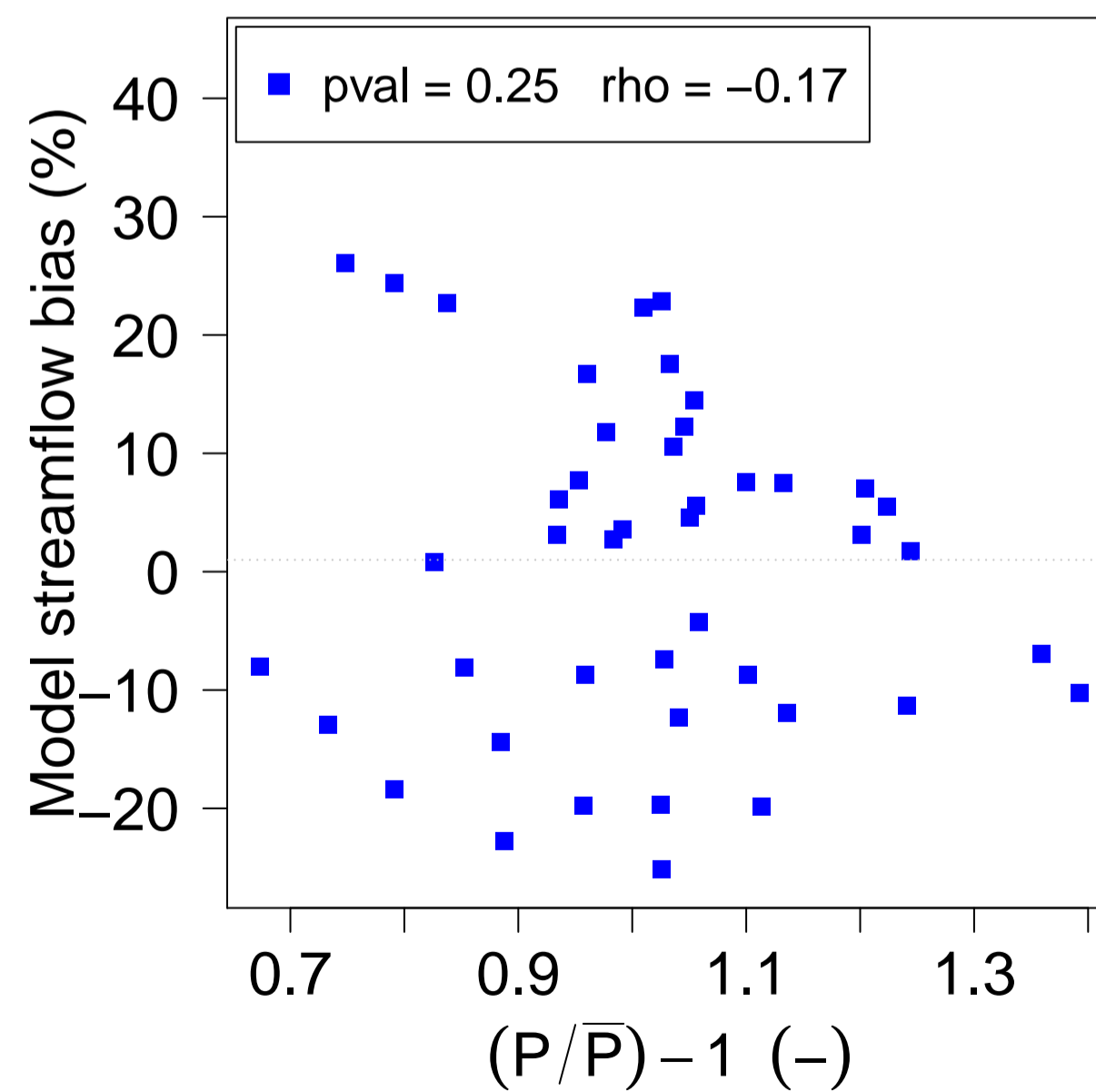
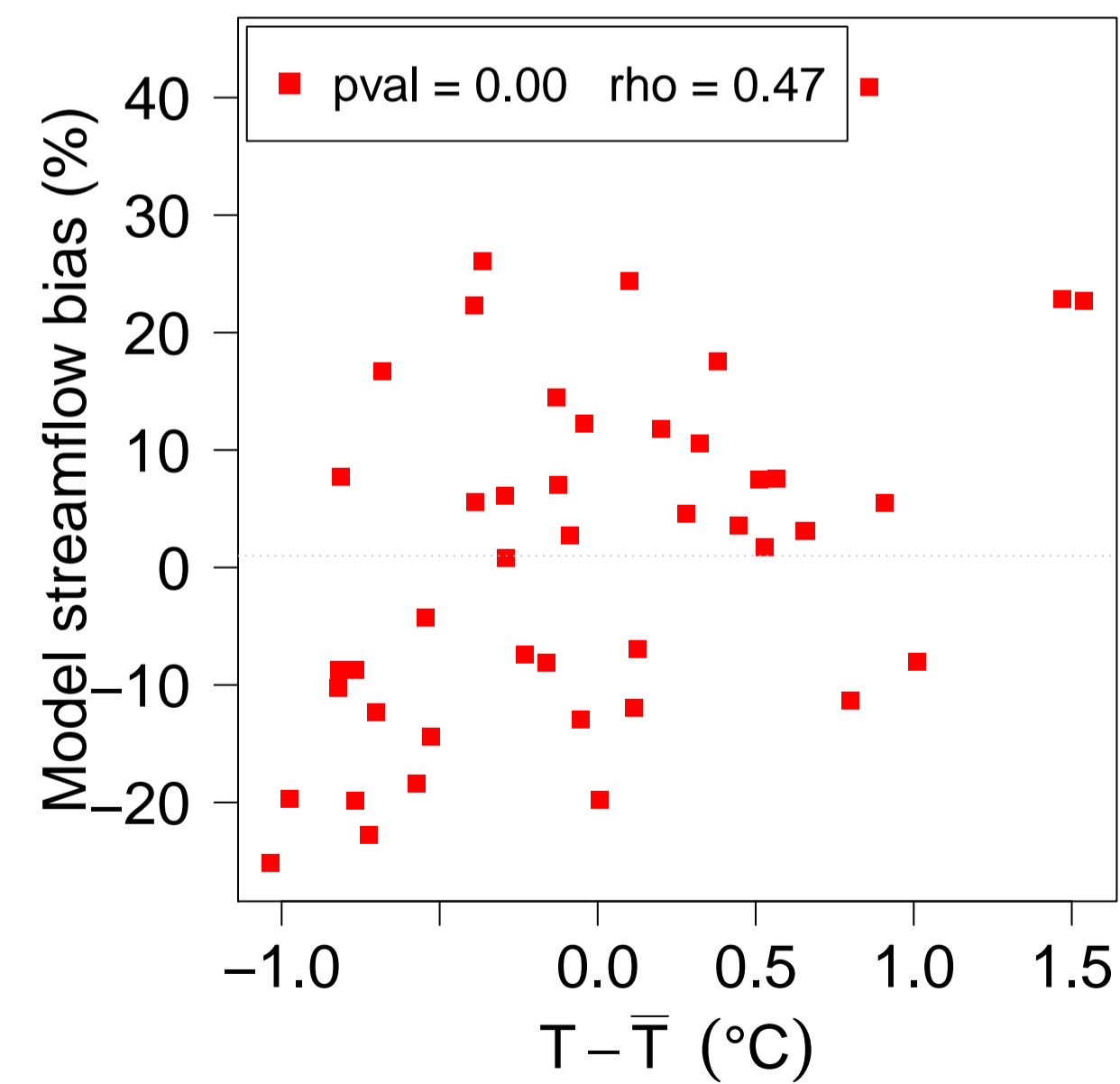
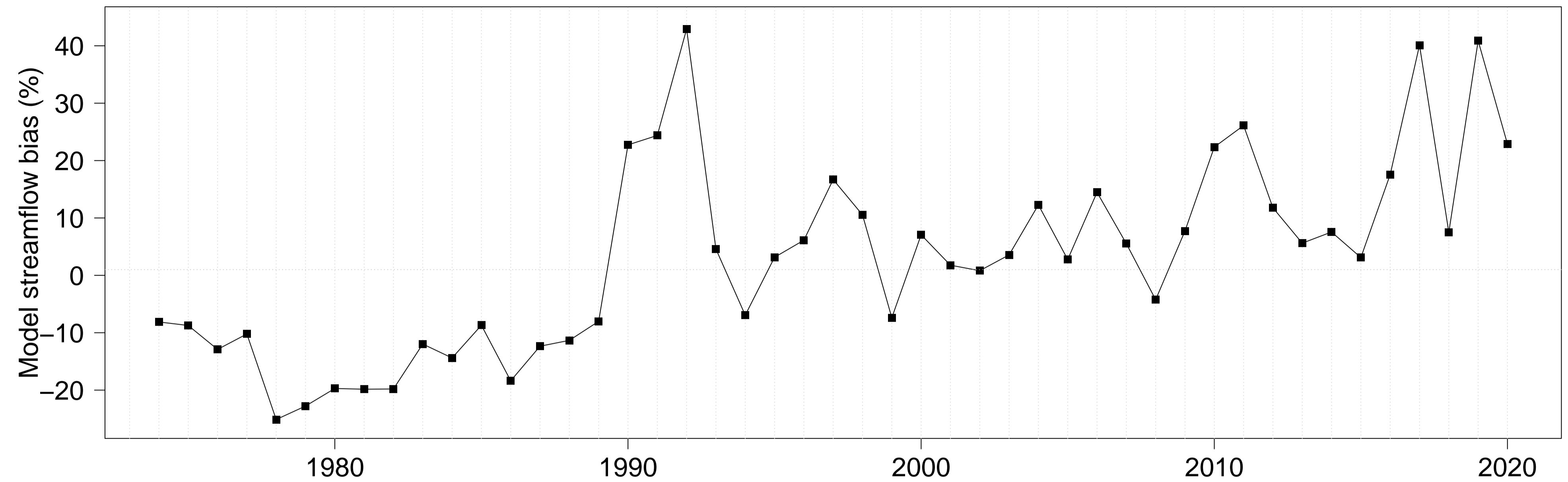


Figure 12. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index $P/E0$ (bottom right) anomalies, for the catchment L4411710

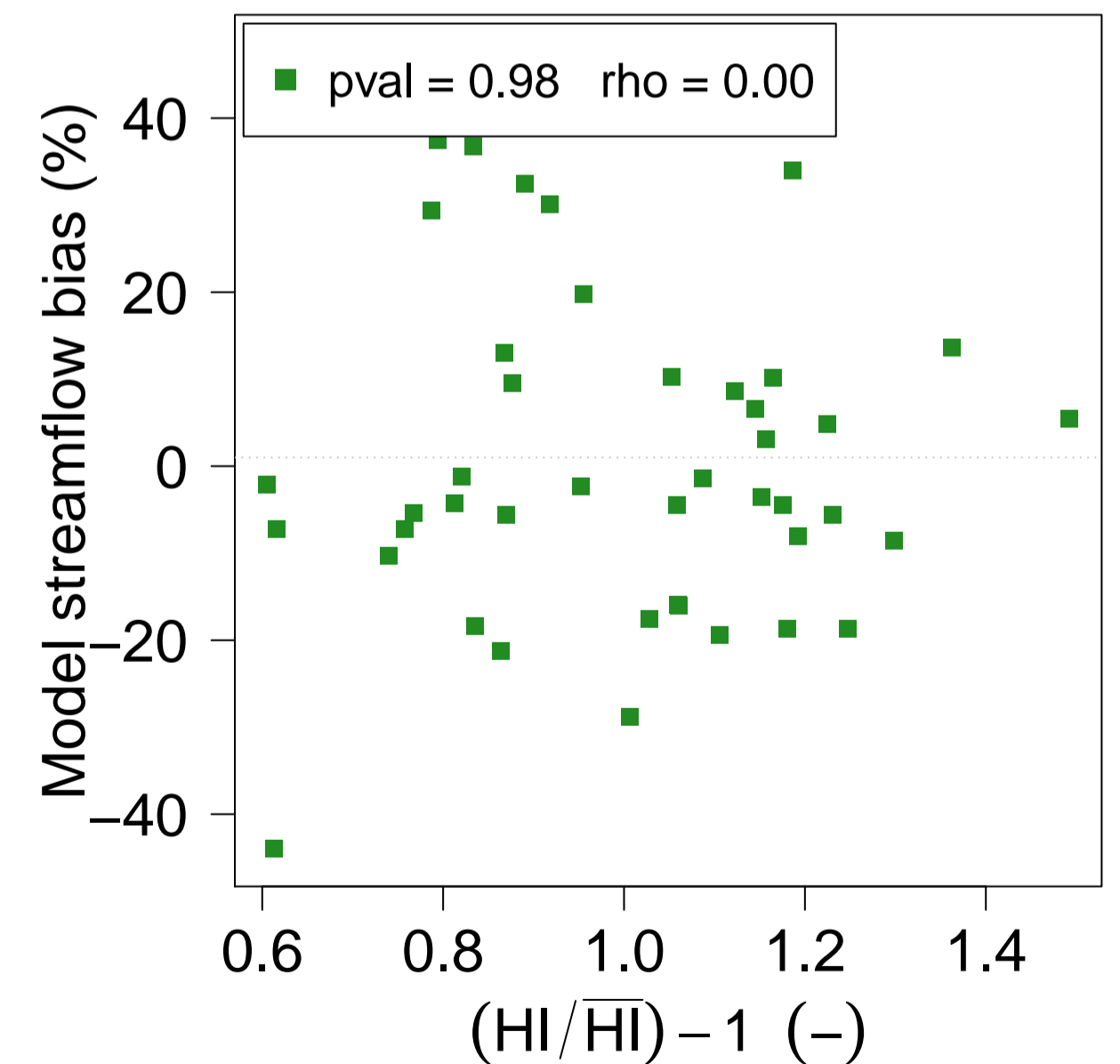
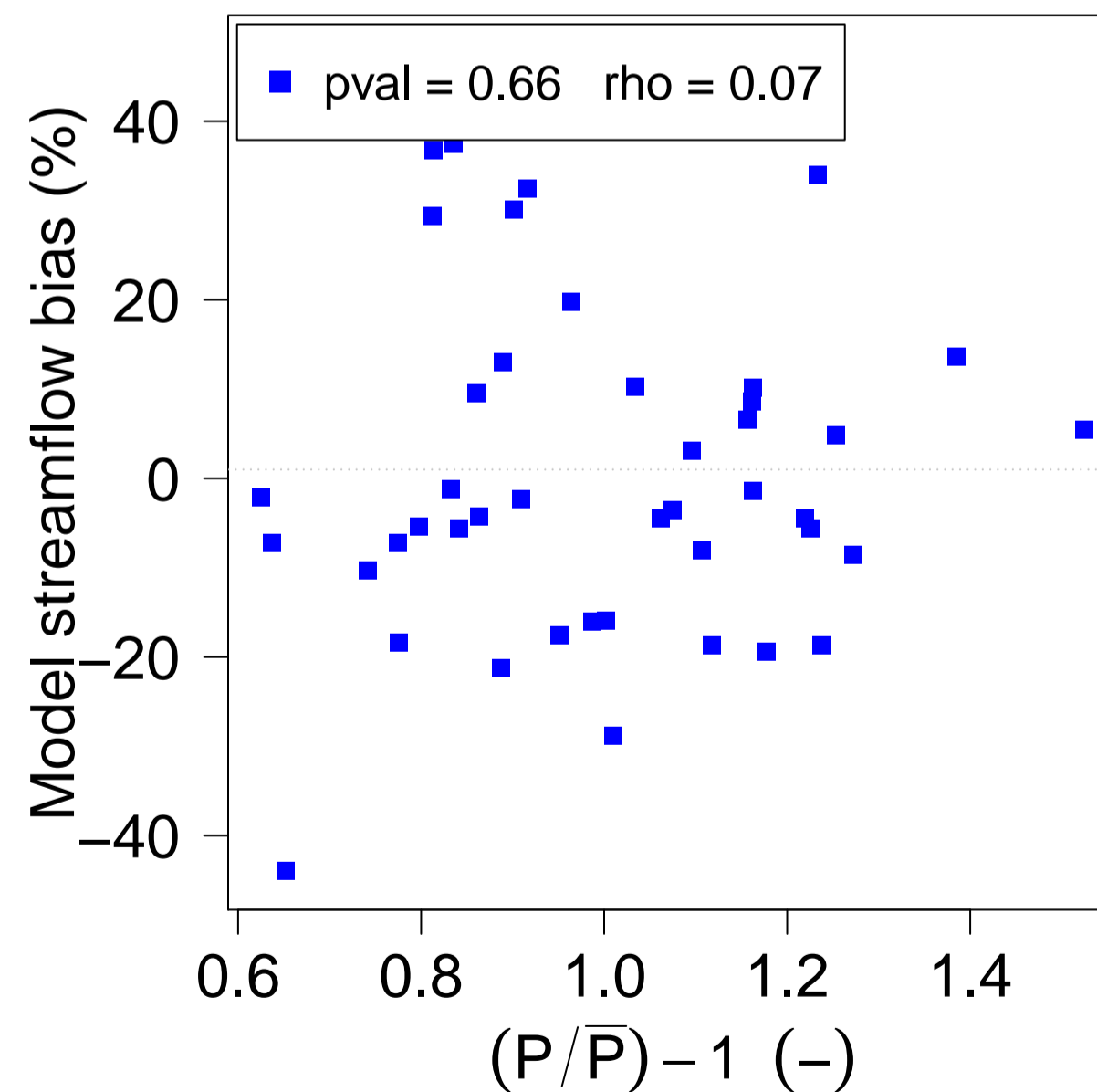
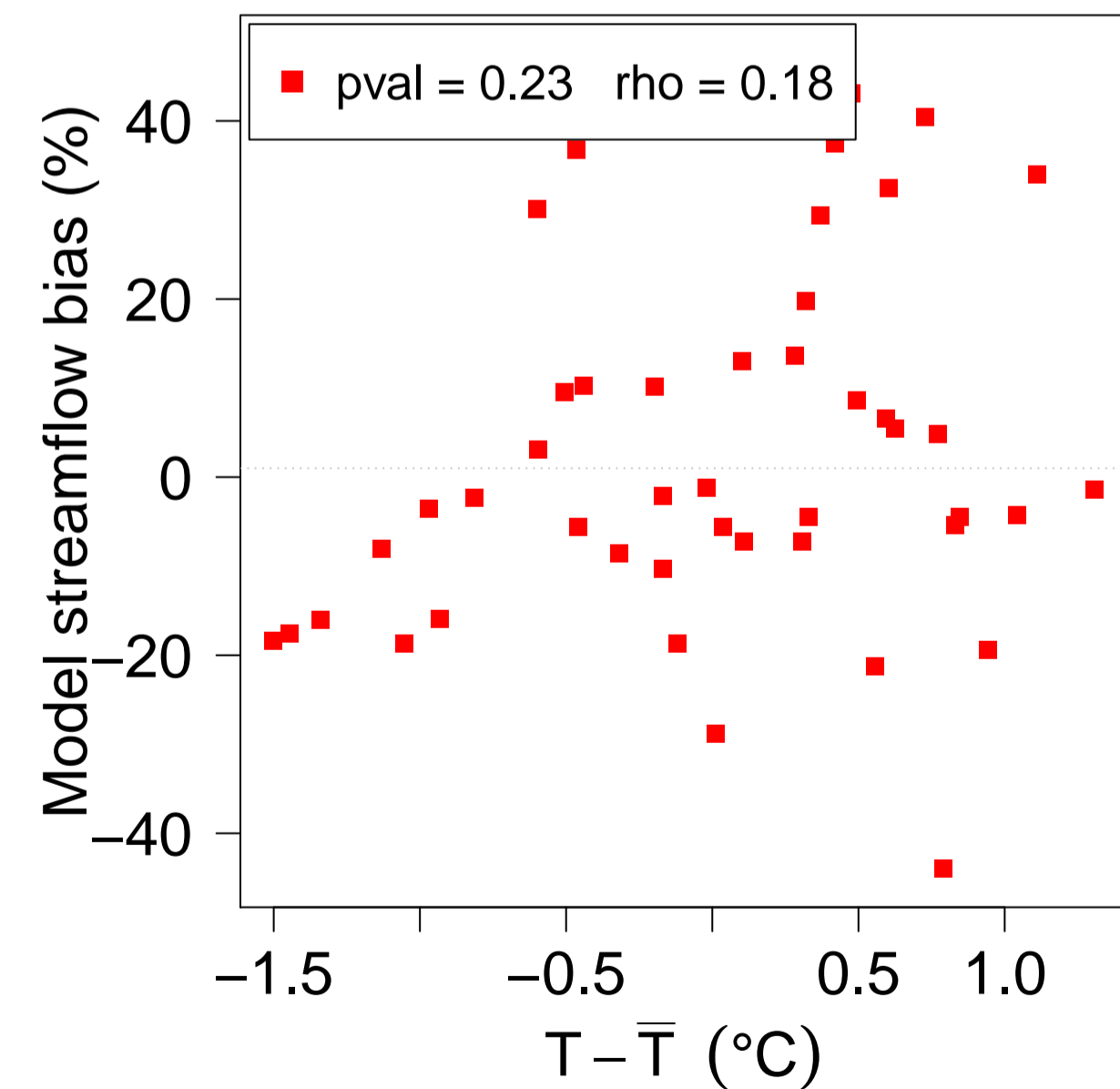
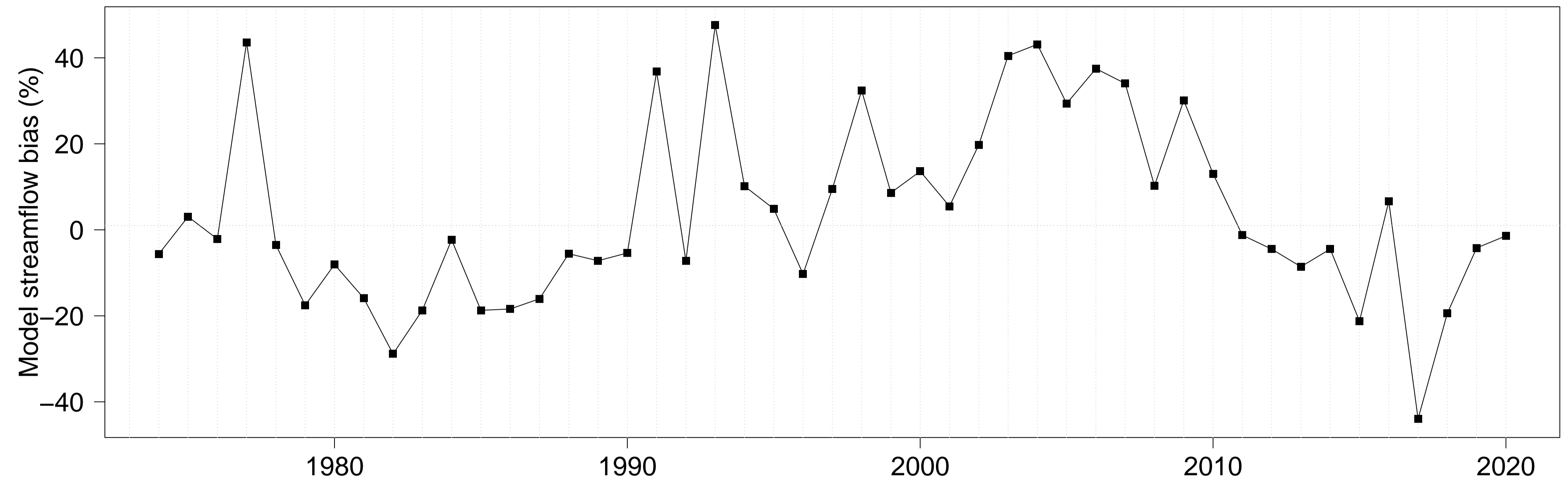


Figure 13. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index $P/E0$ (bottom right) anomalies, for the catchment M0243010

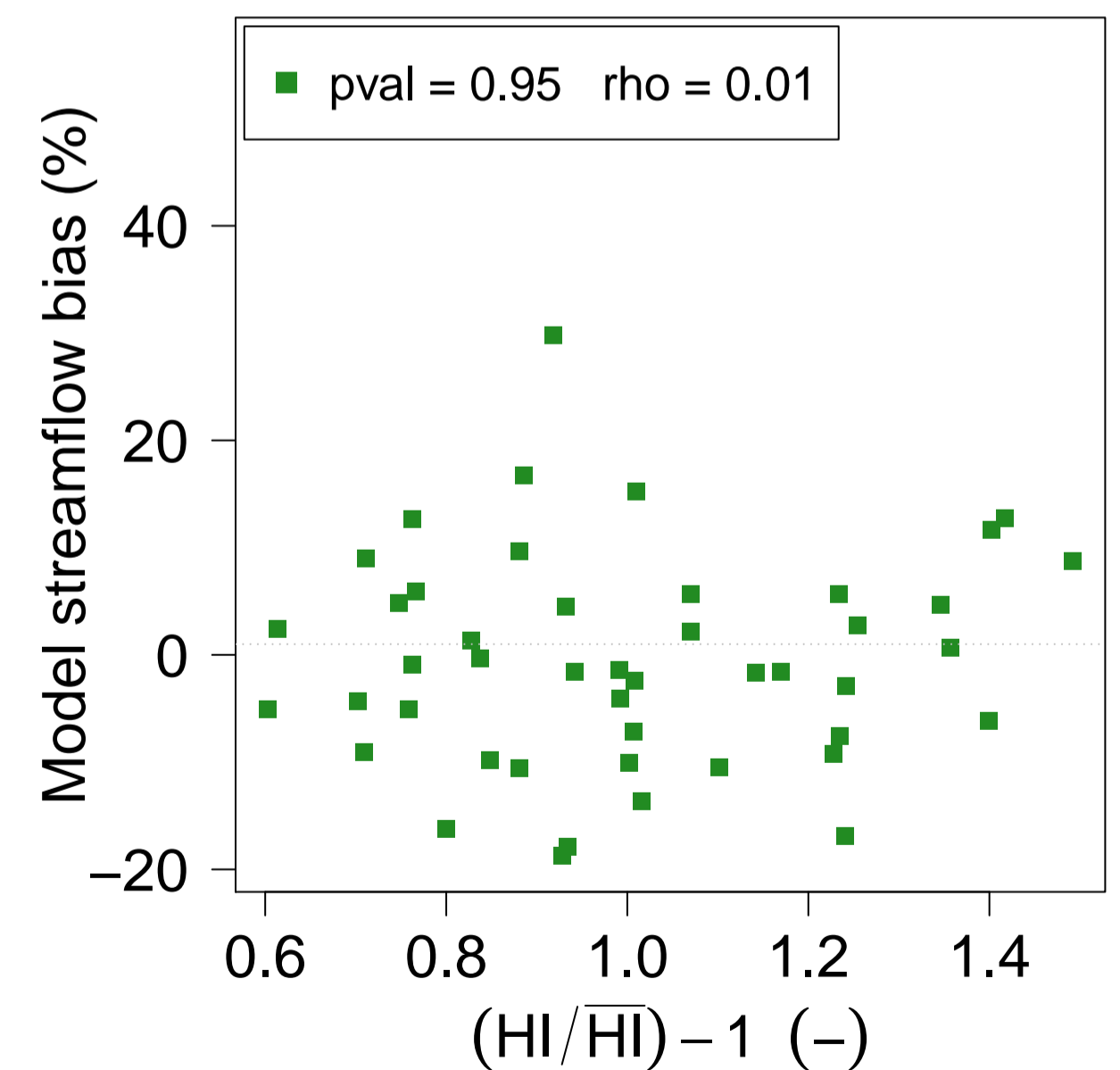
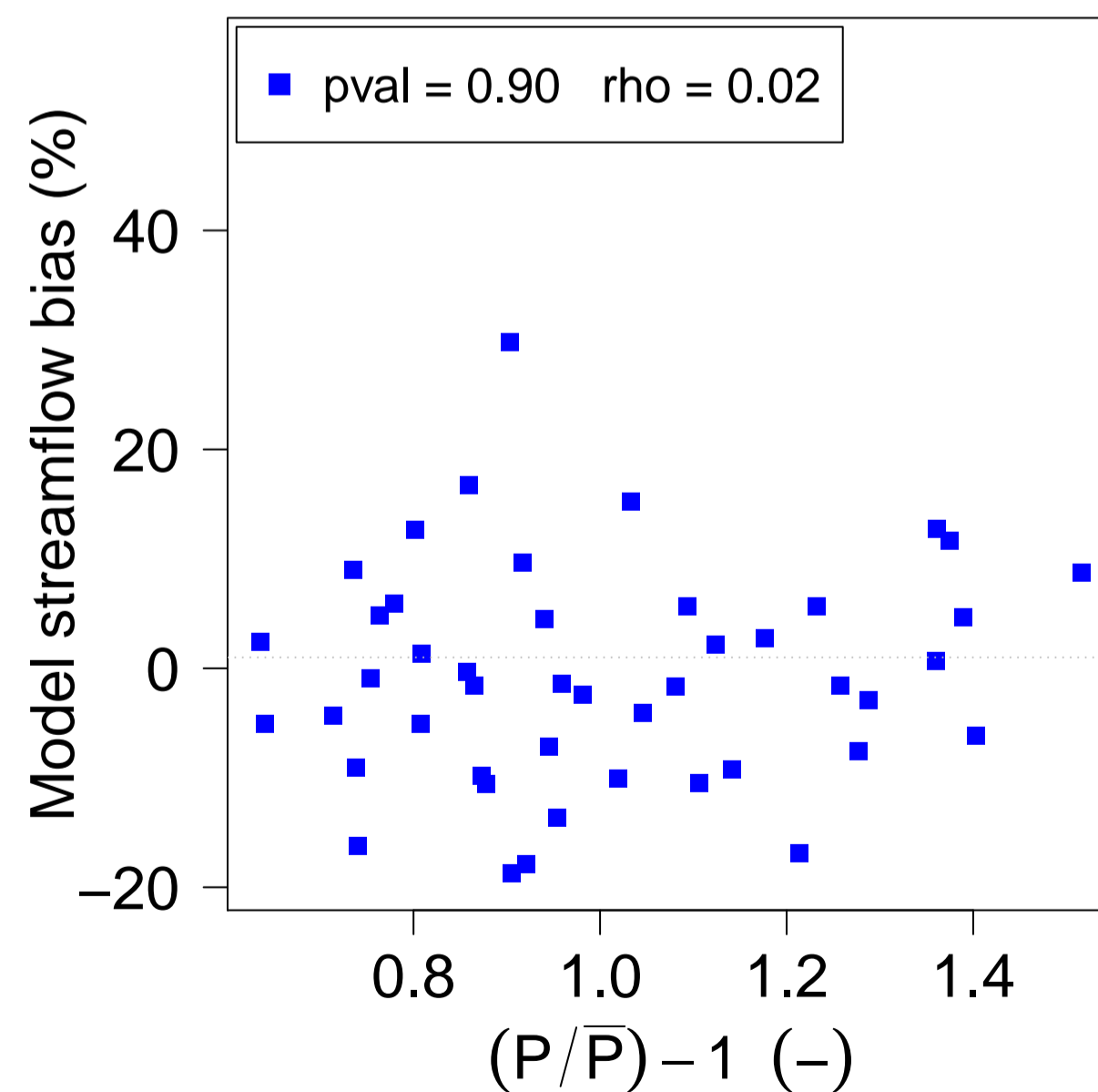
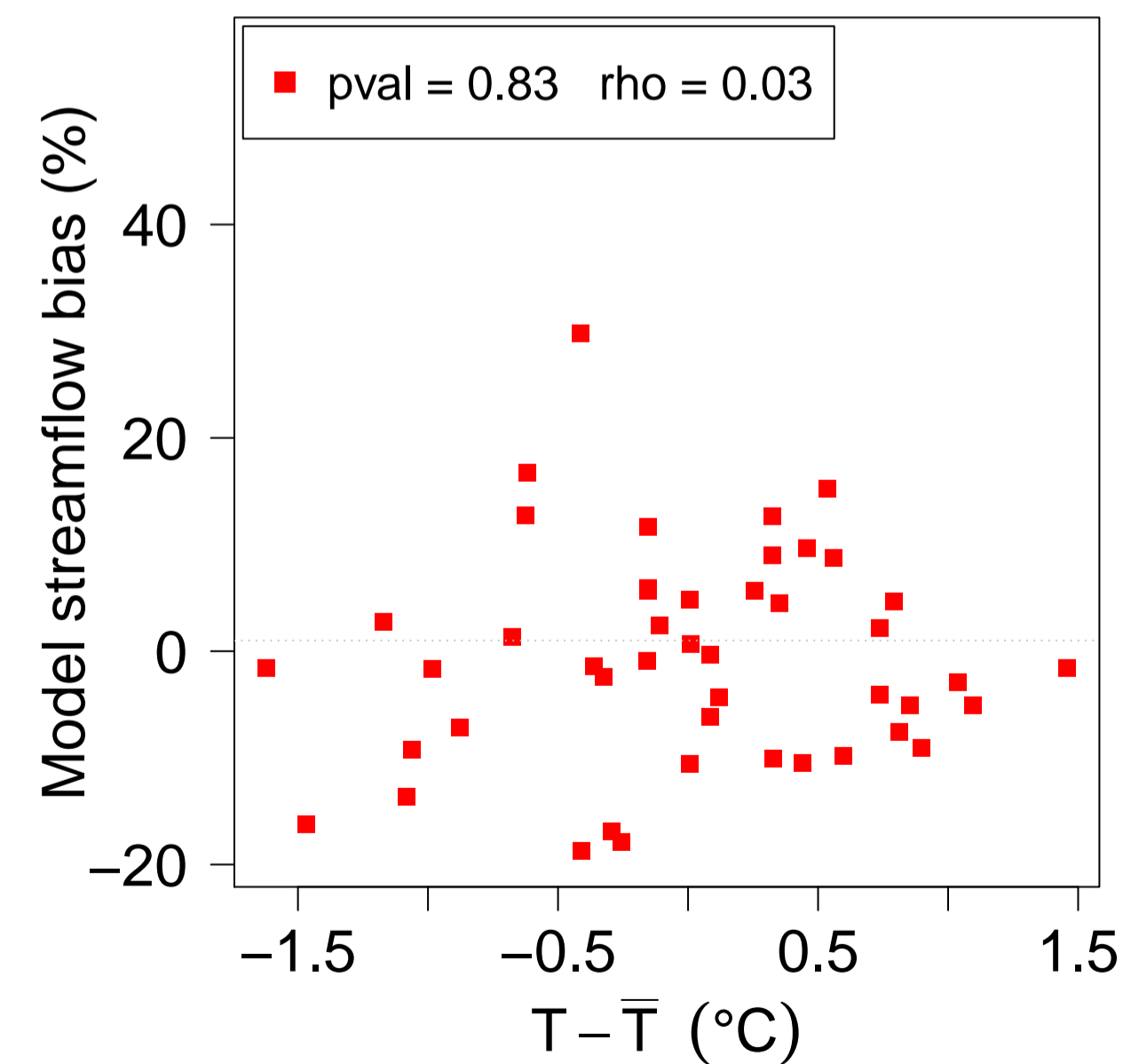
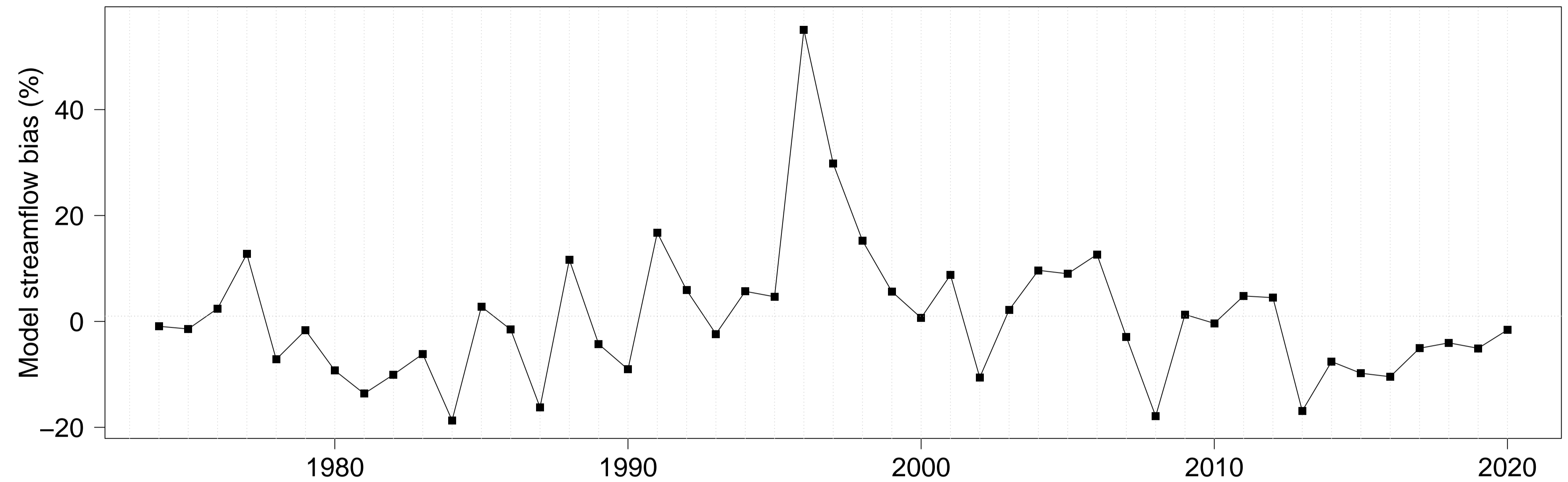


Figure 14. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index $P/E0$ (bottom right) anomalies, for the catchment M7112410

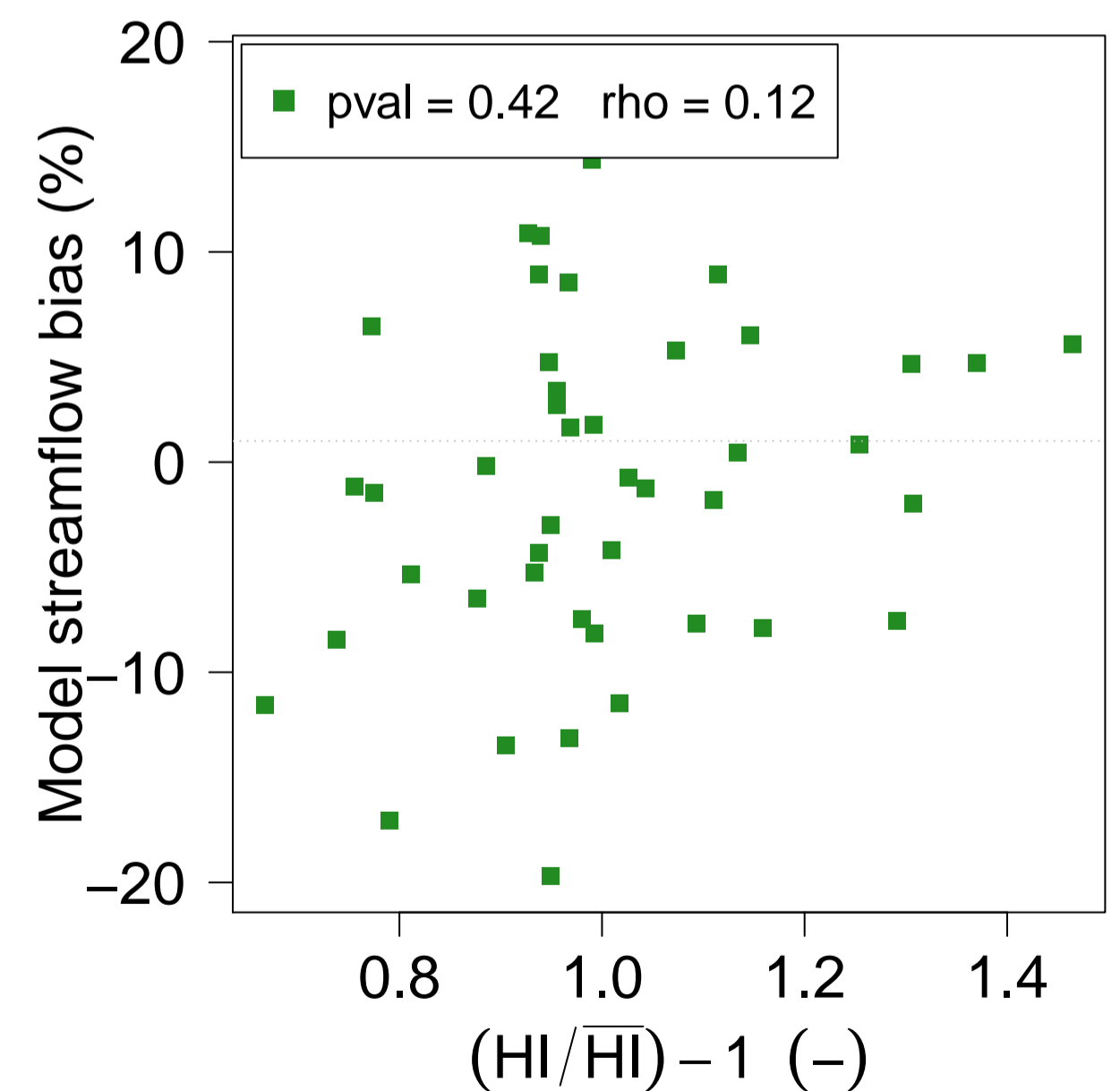
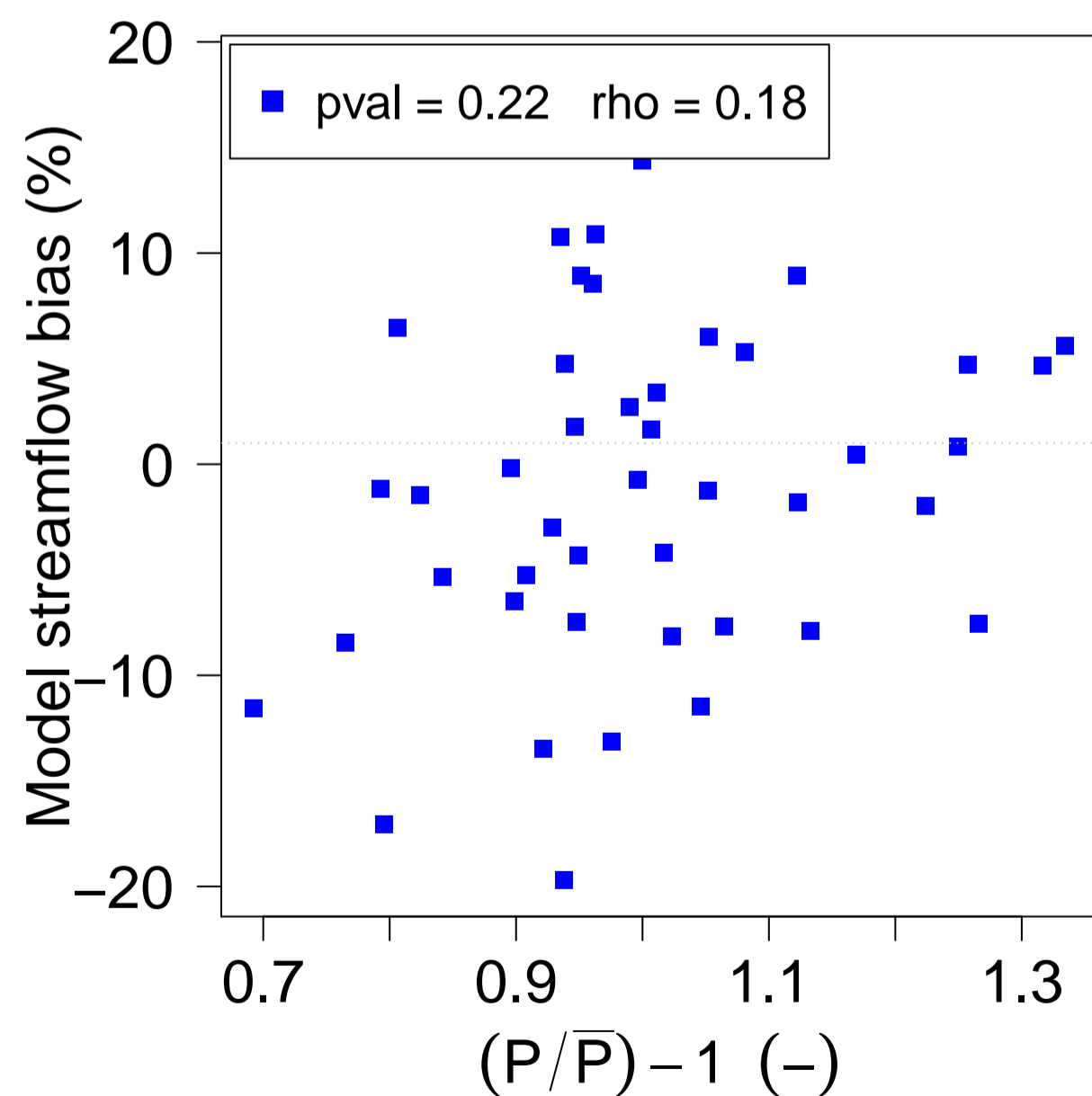
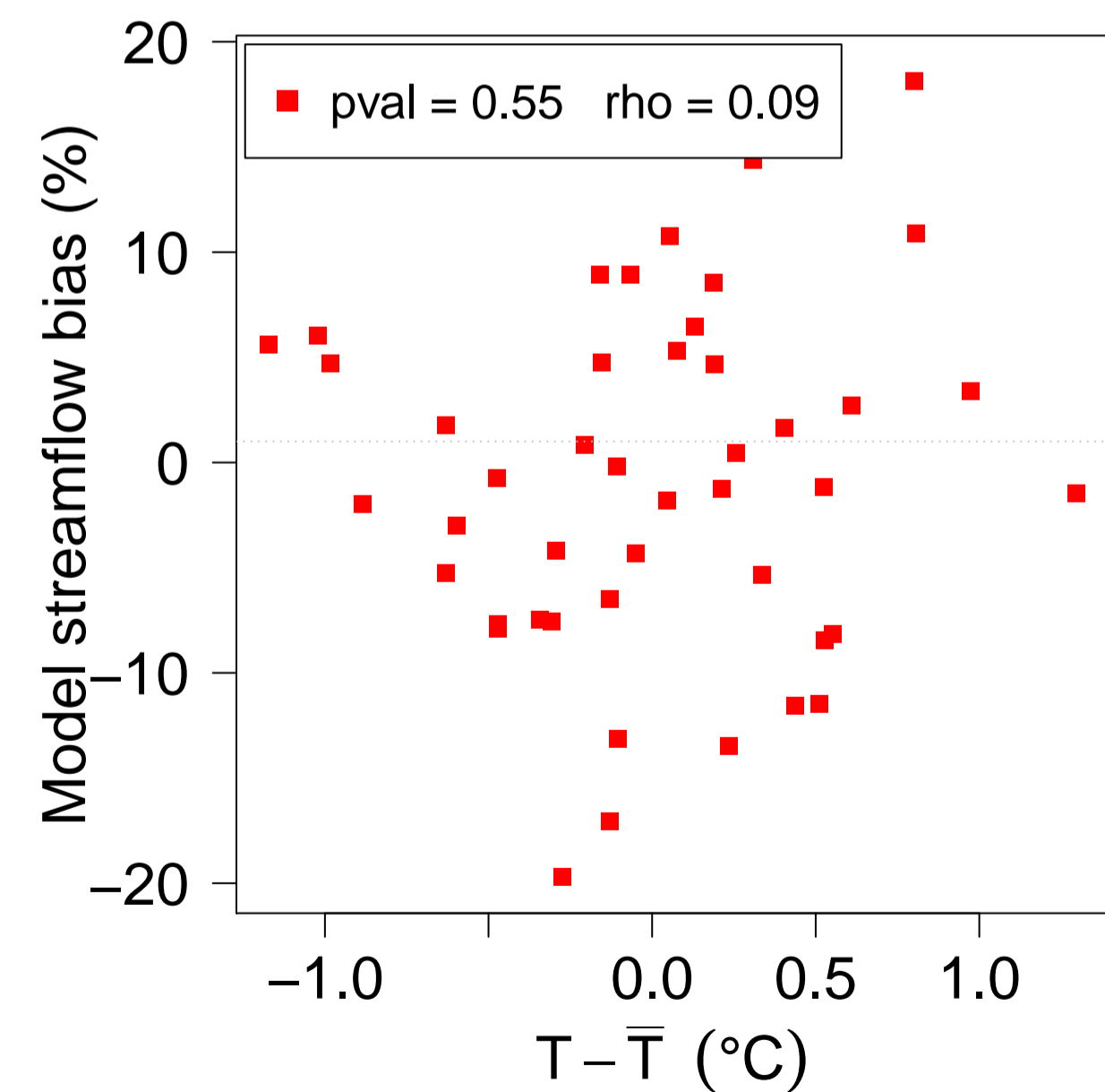
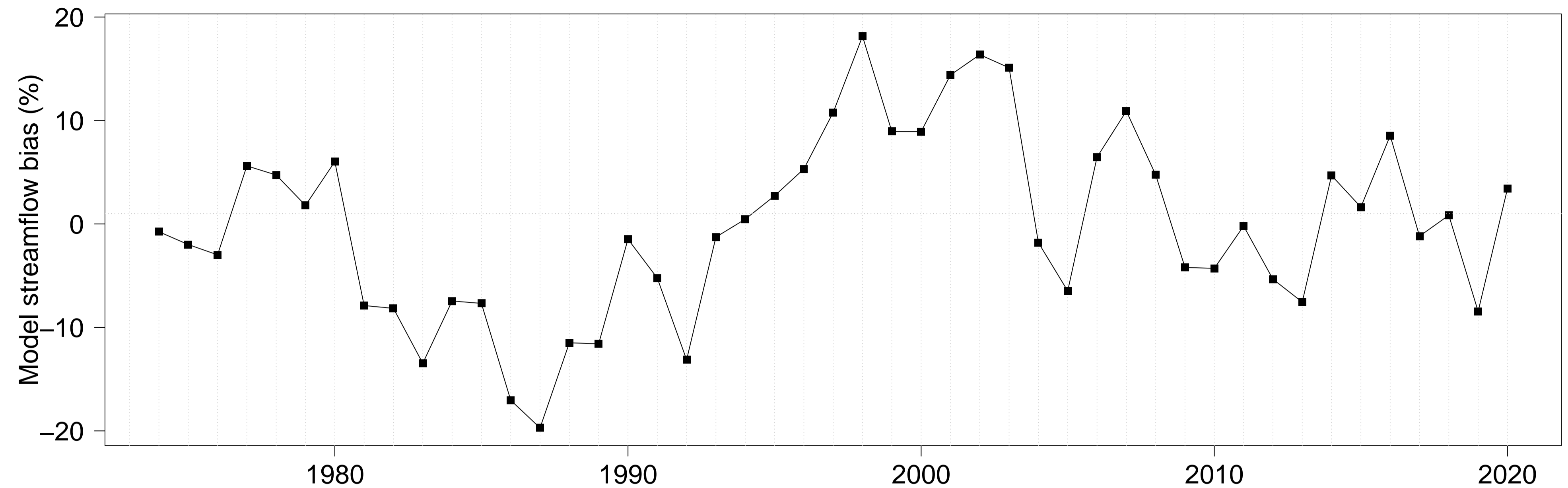


Figure 15. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment O0592510

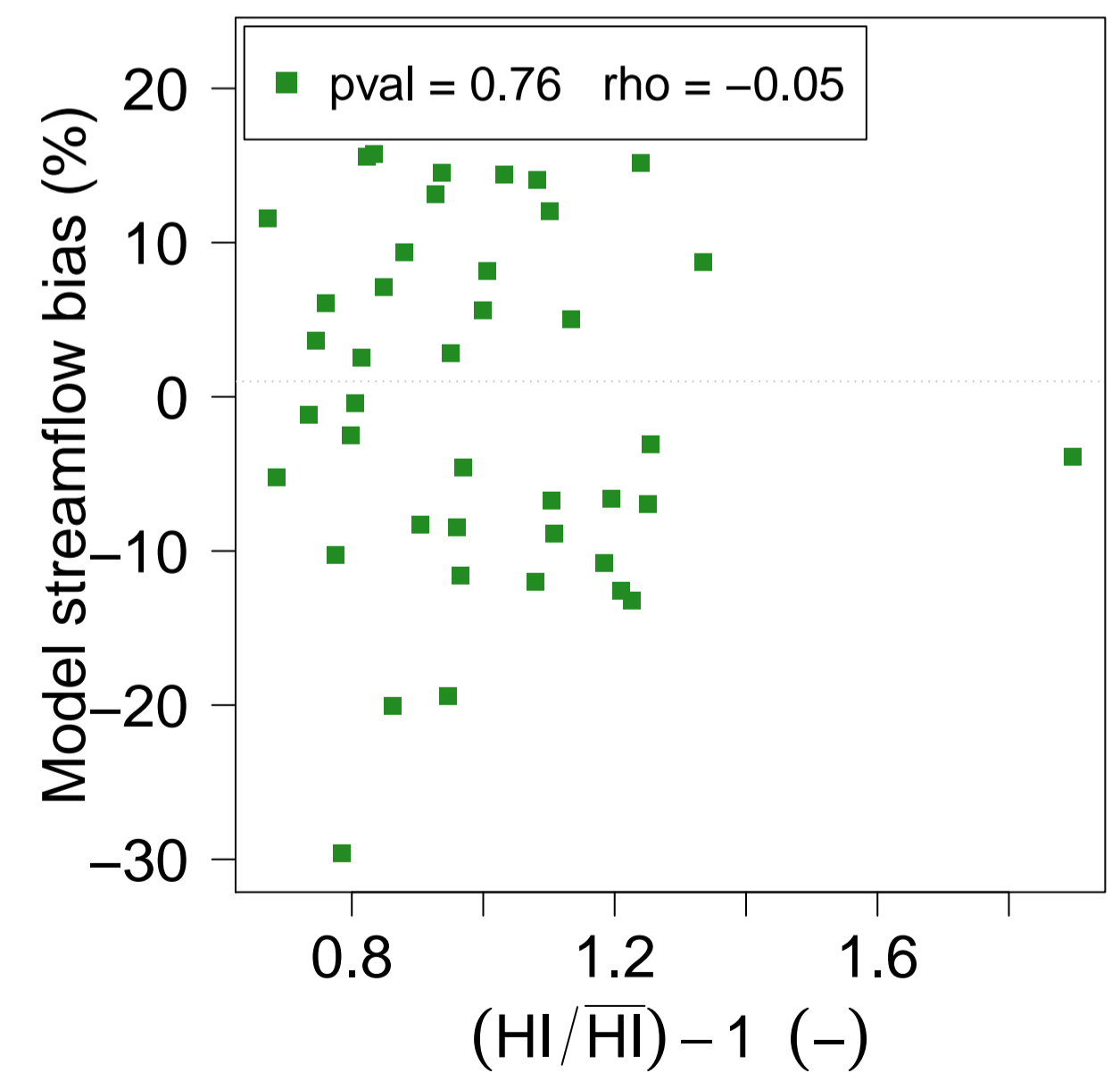
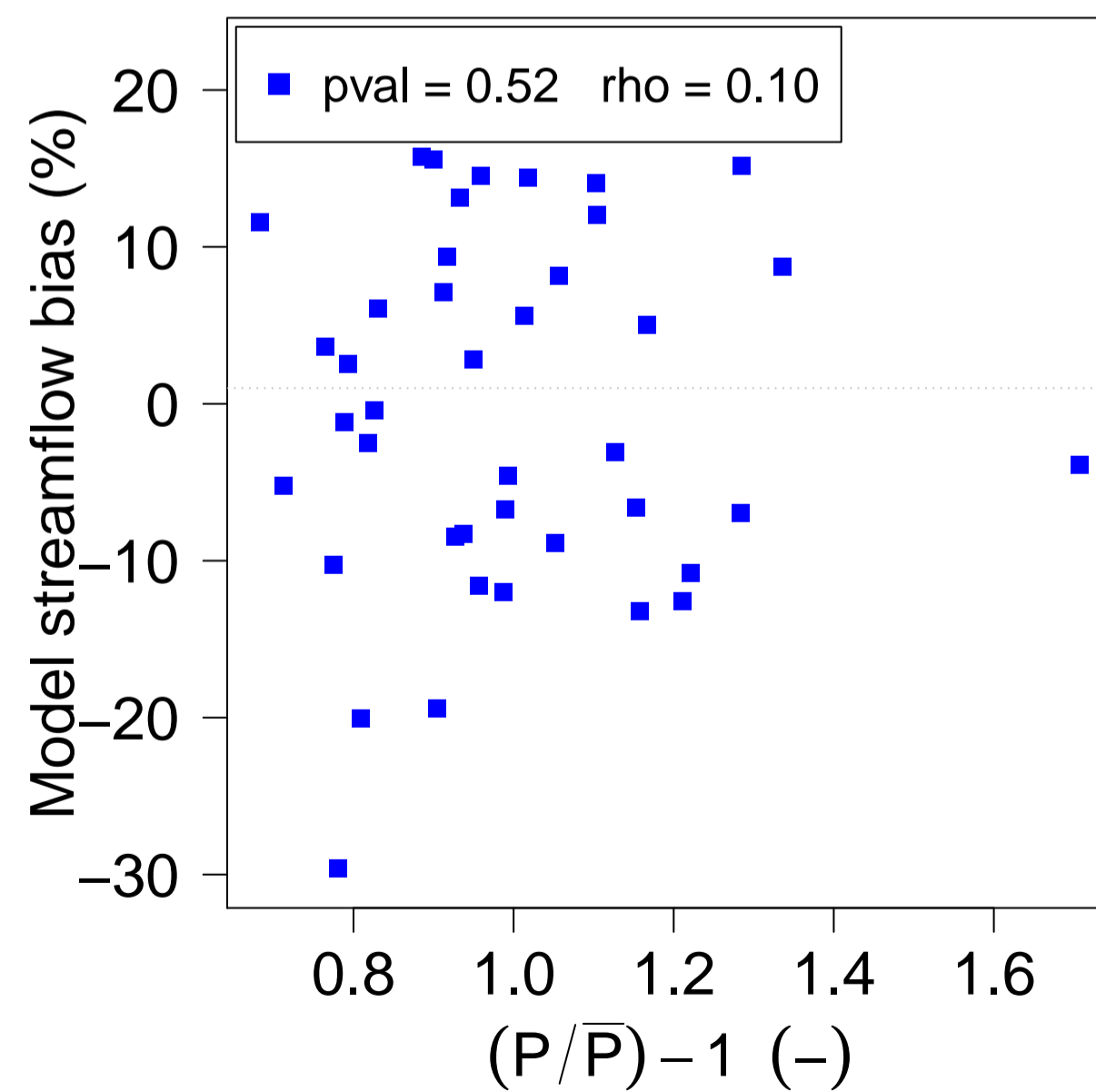
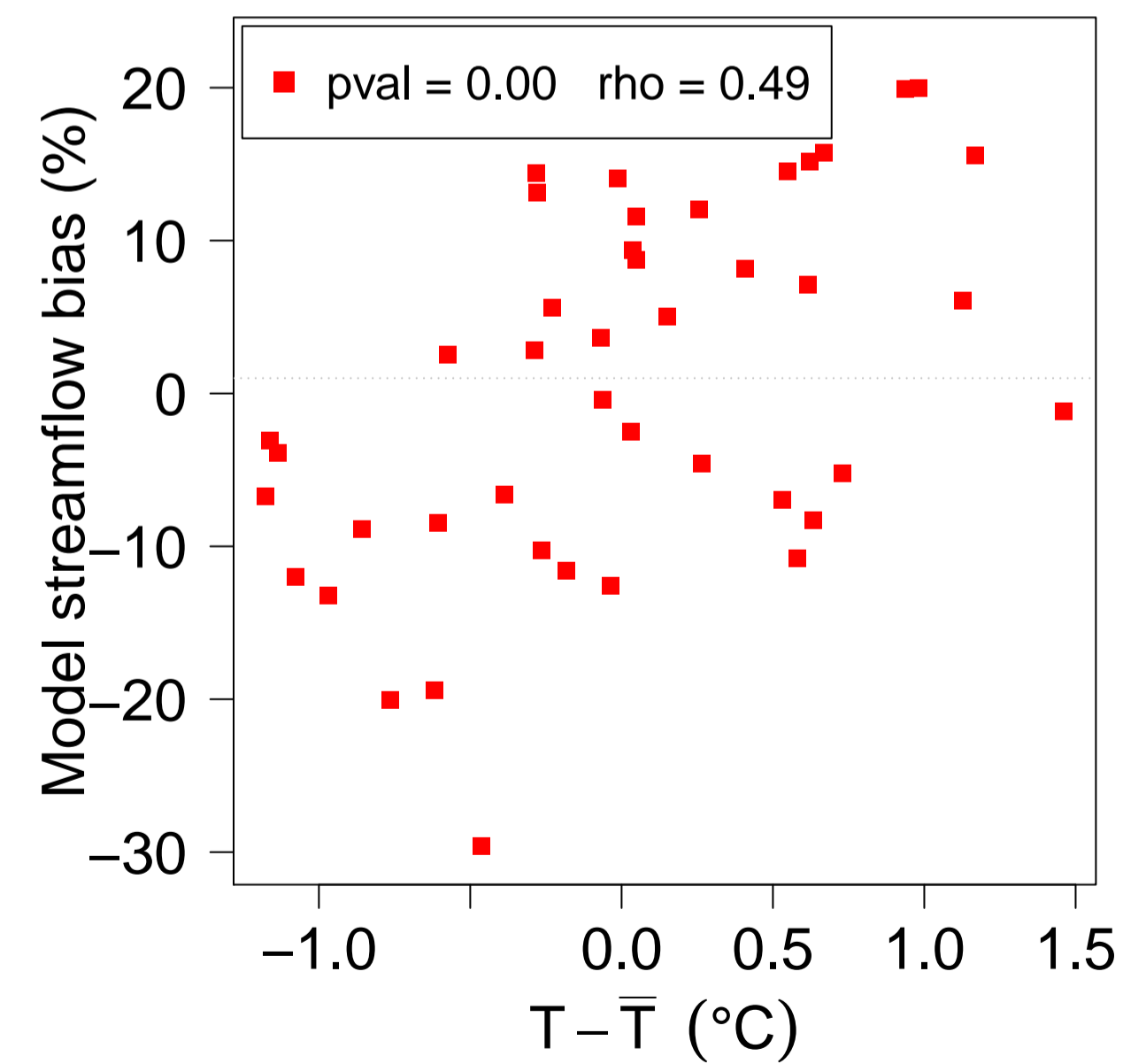
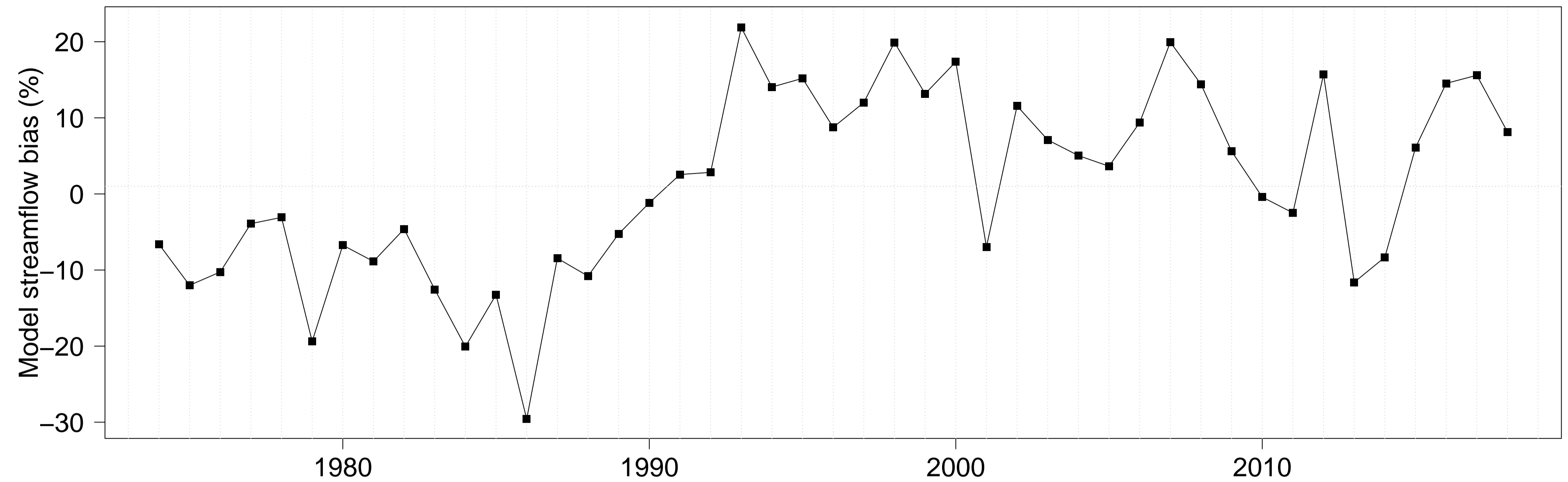


Figure 16. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment O7101510

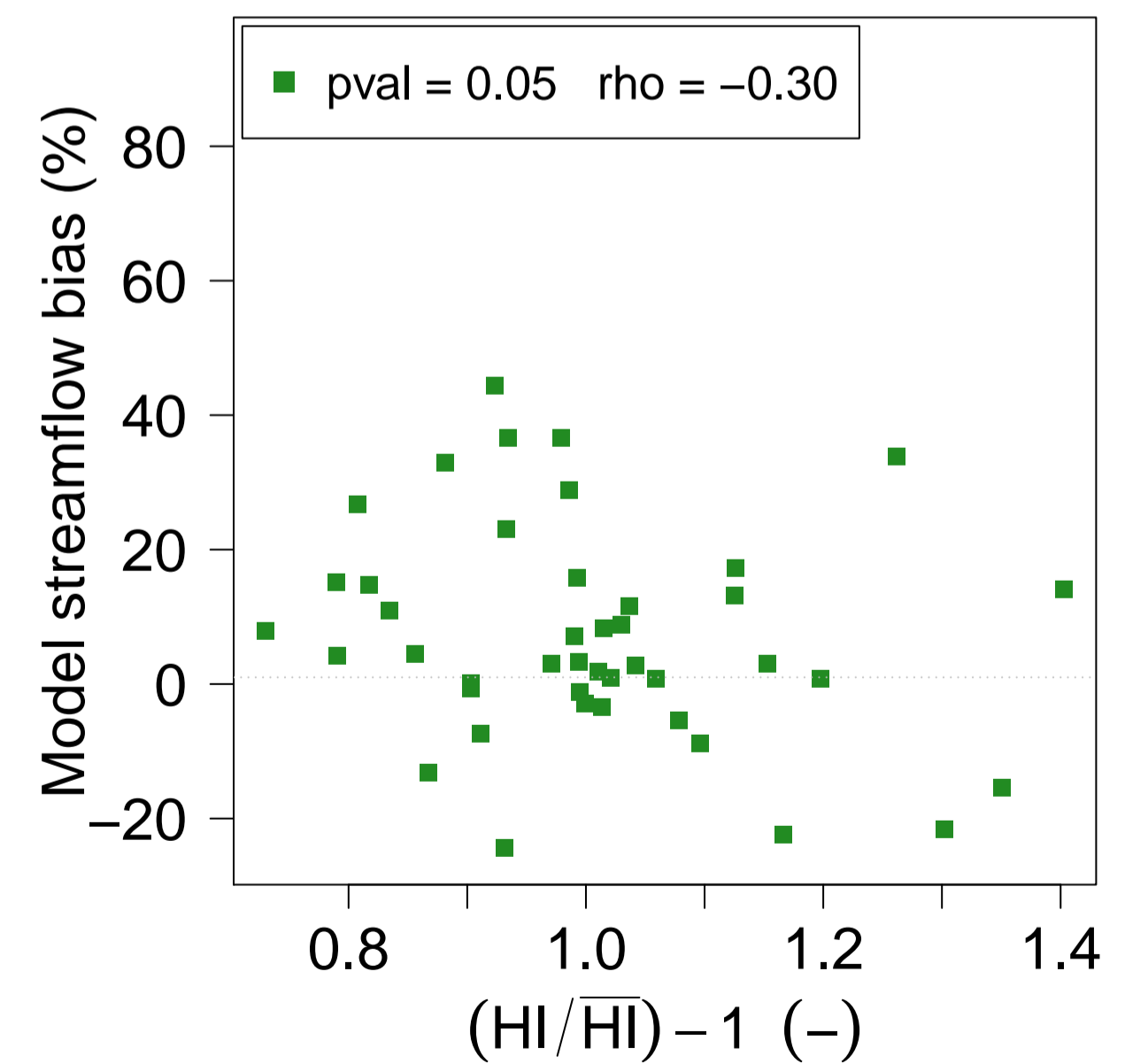
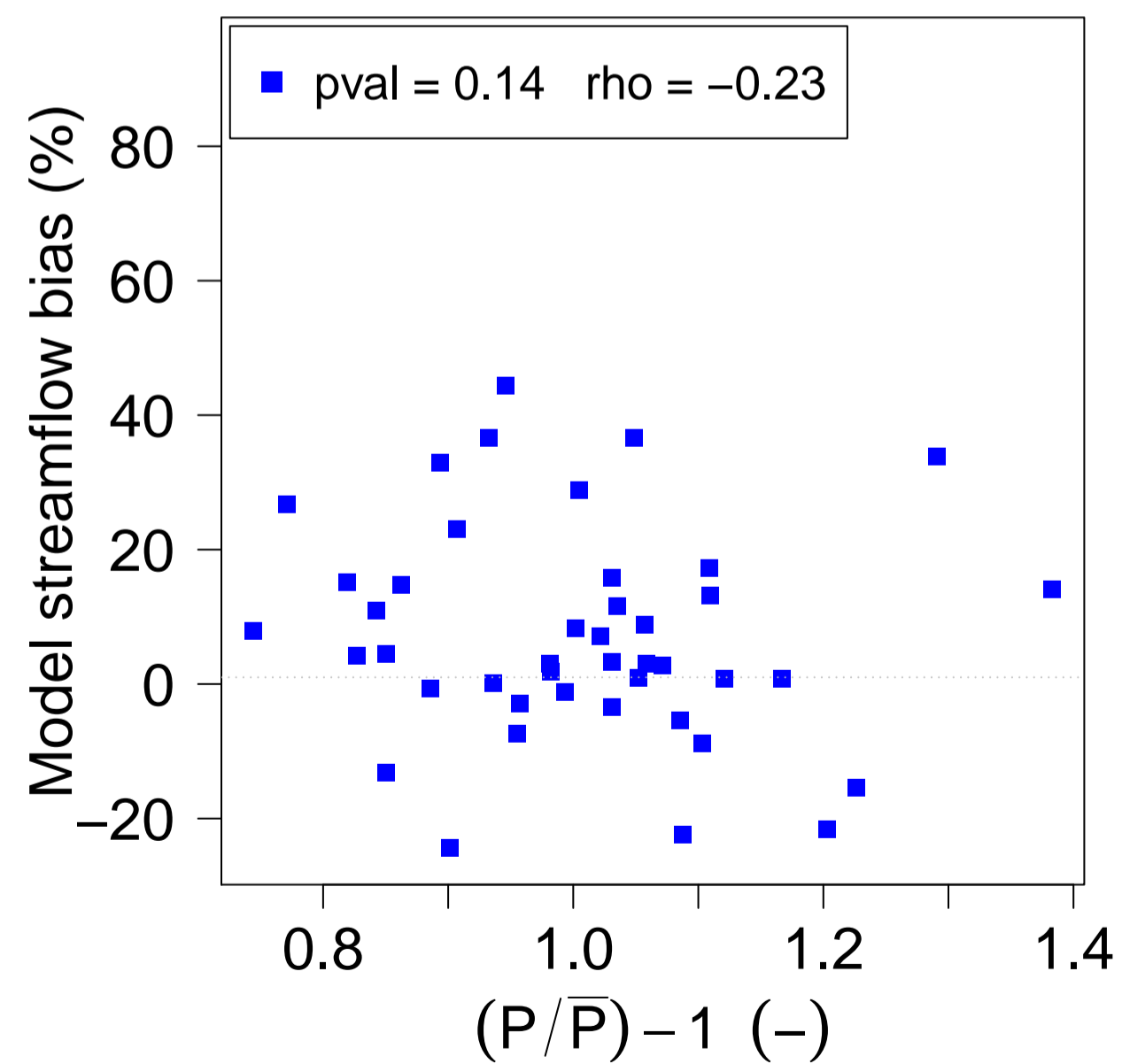
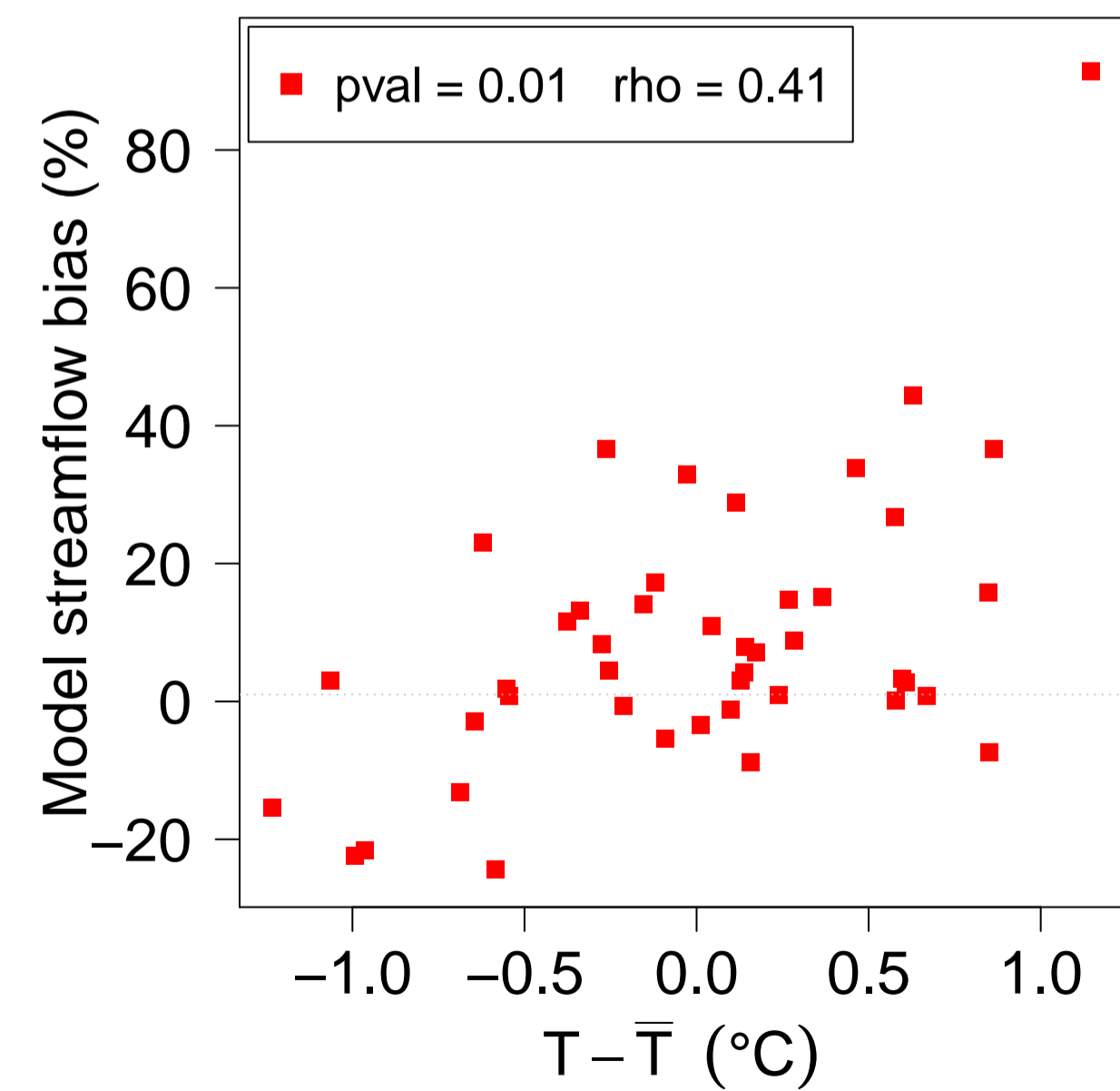
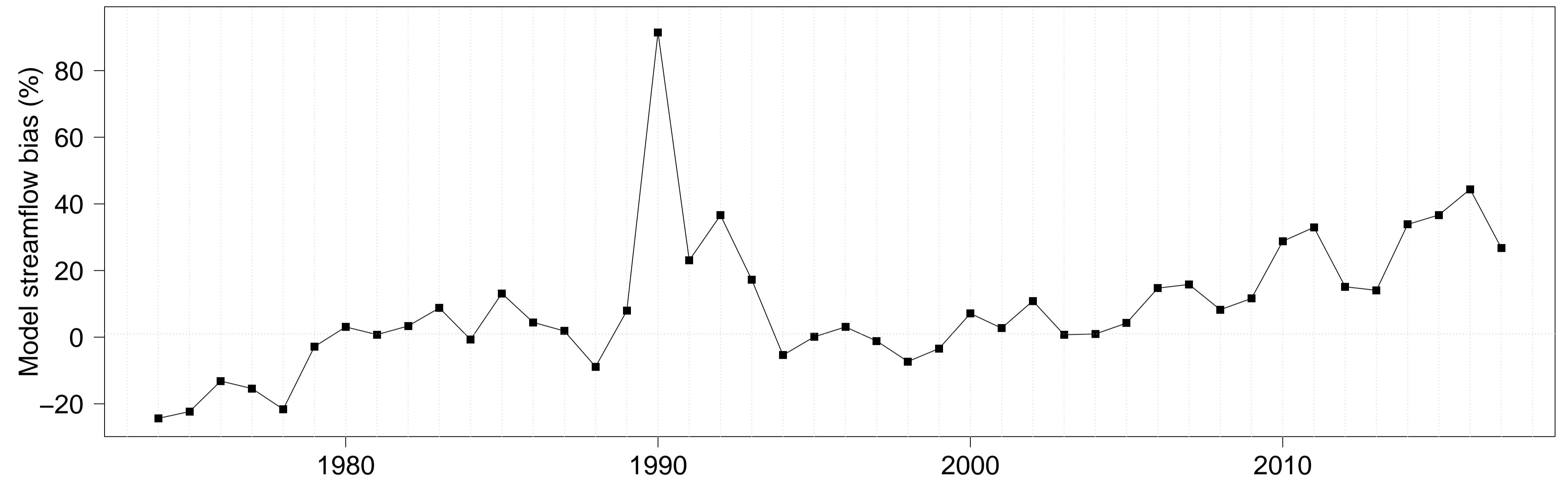


Figure 17. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment Q5501010

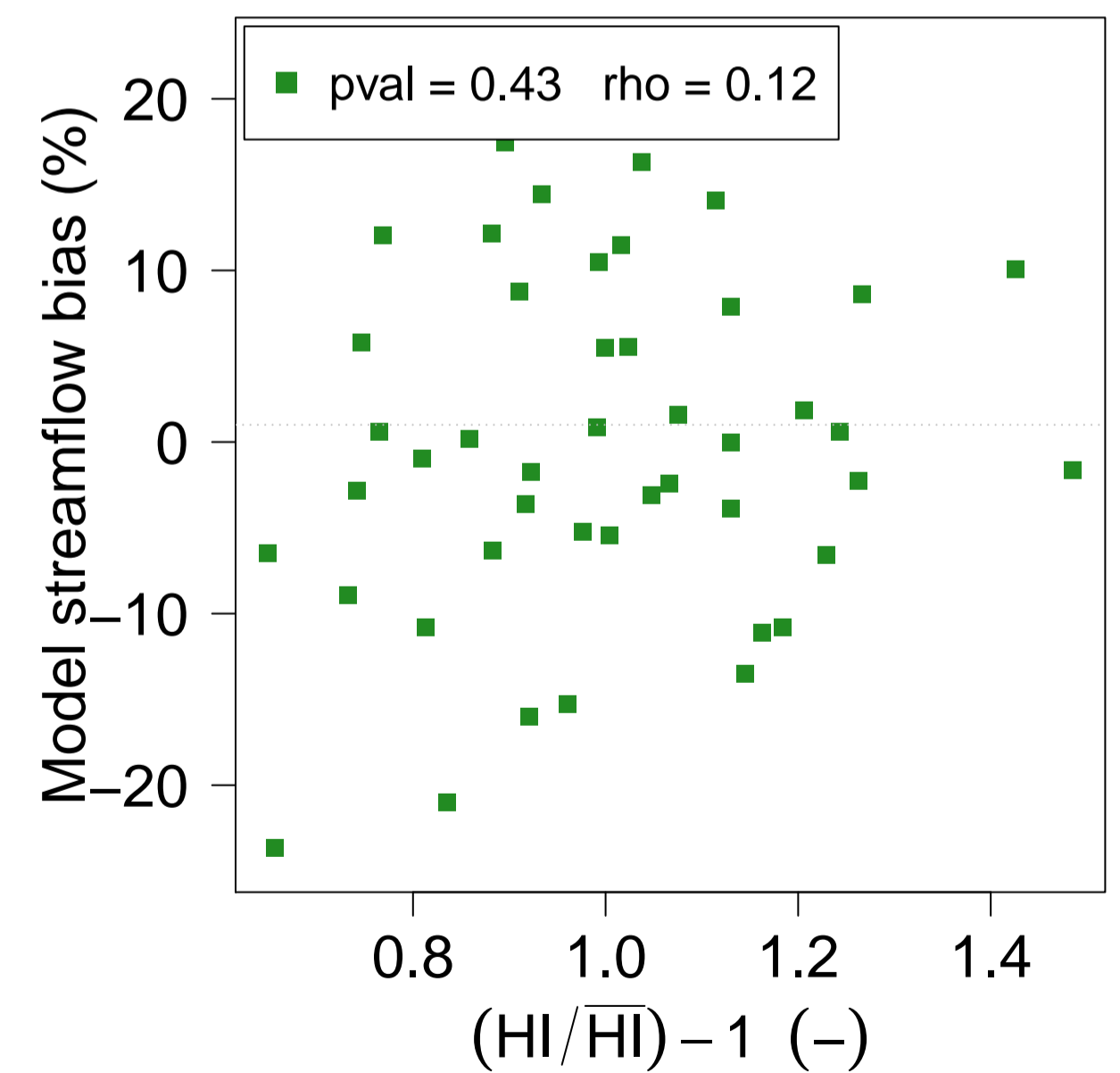
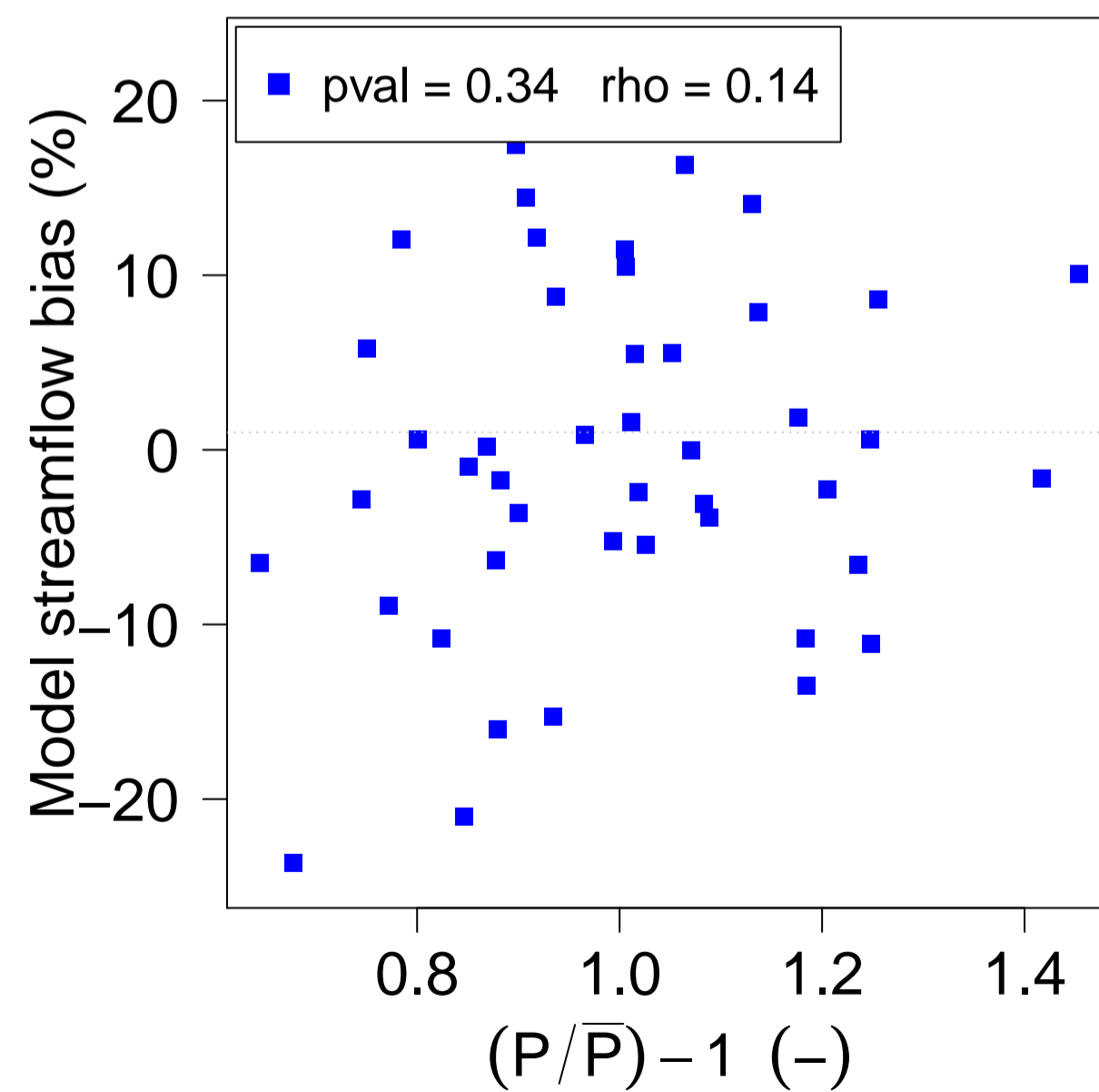
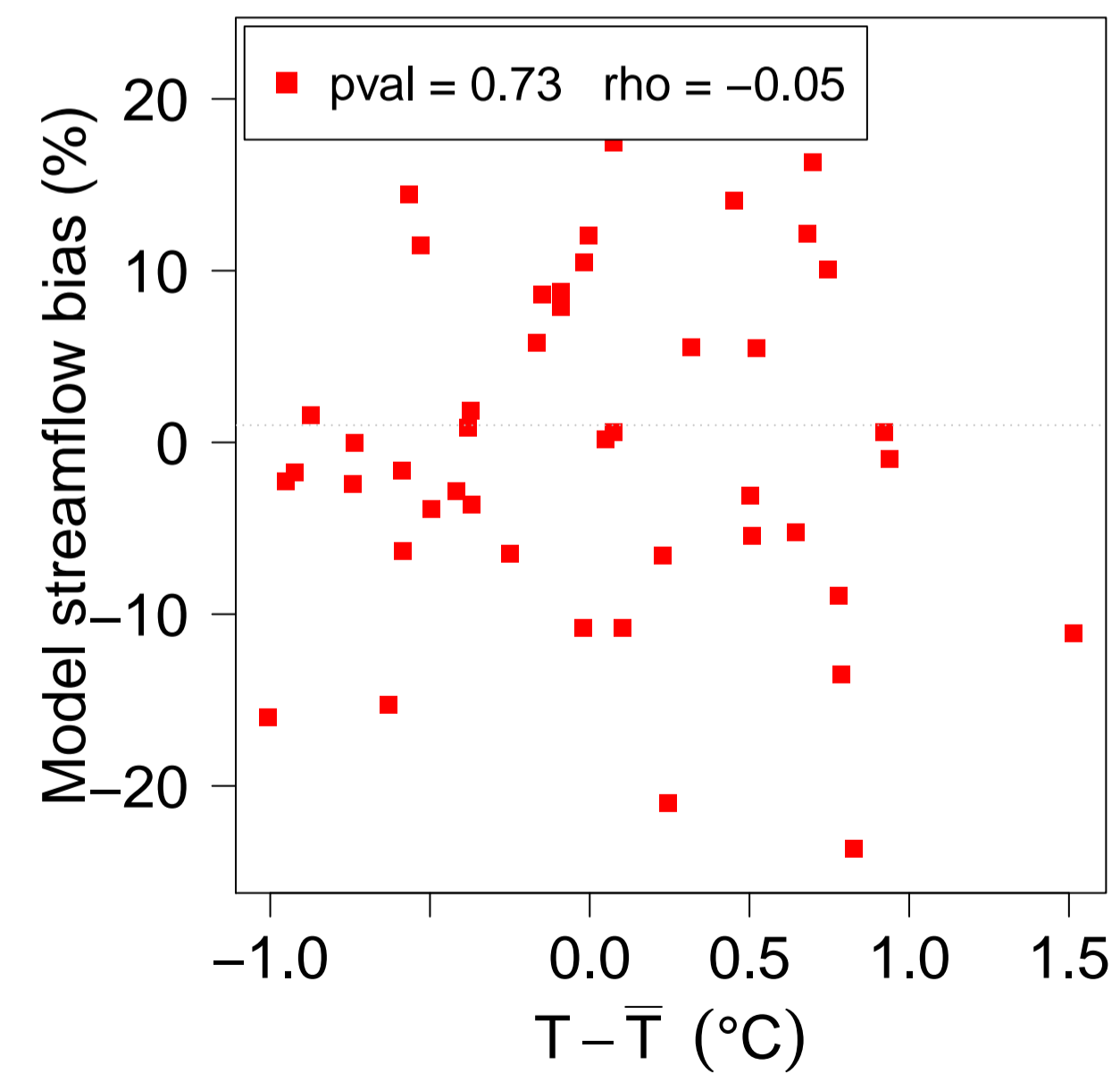
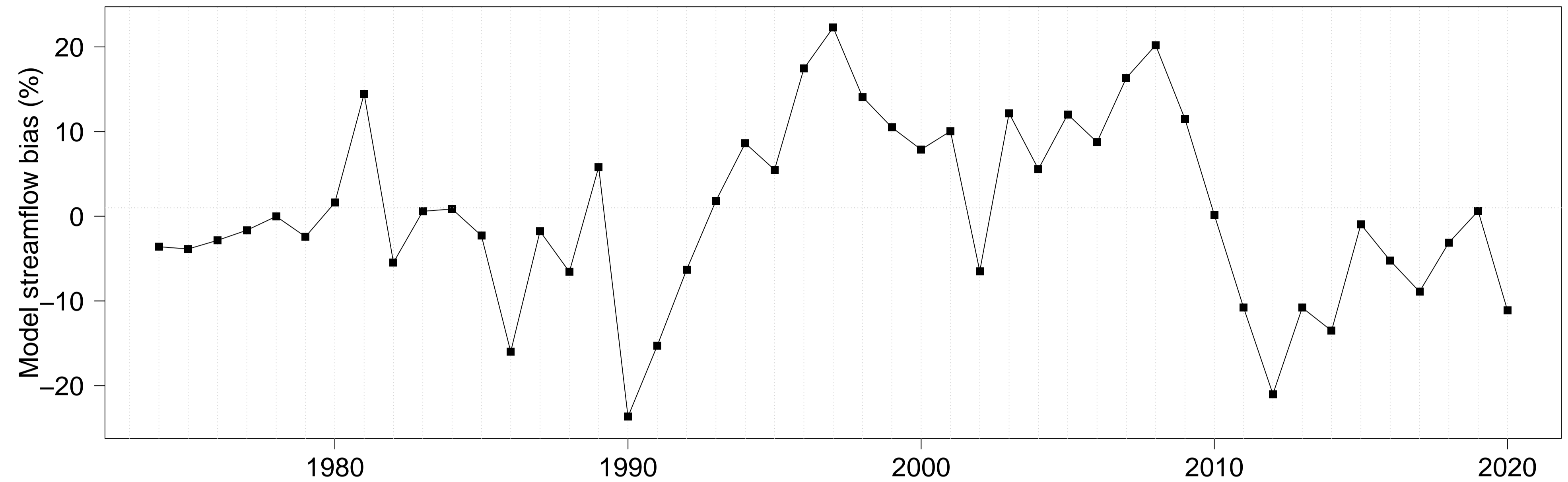


Figure 18. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment S2242510

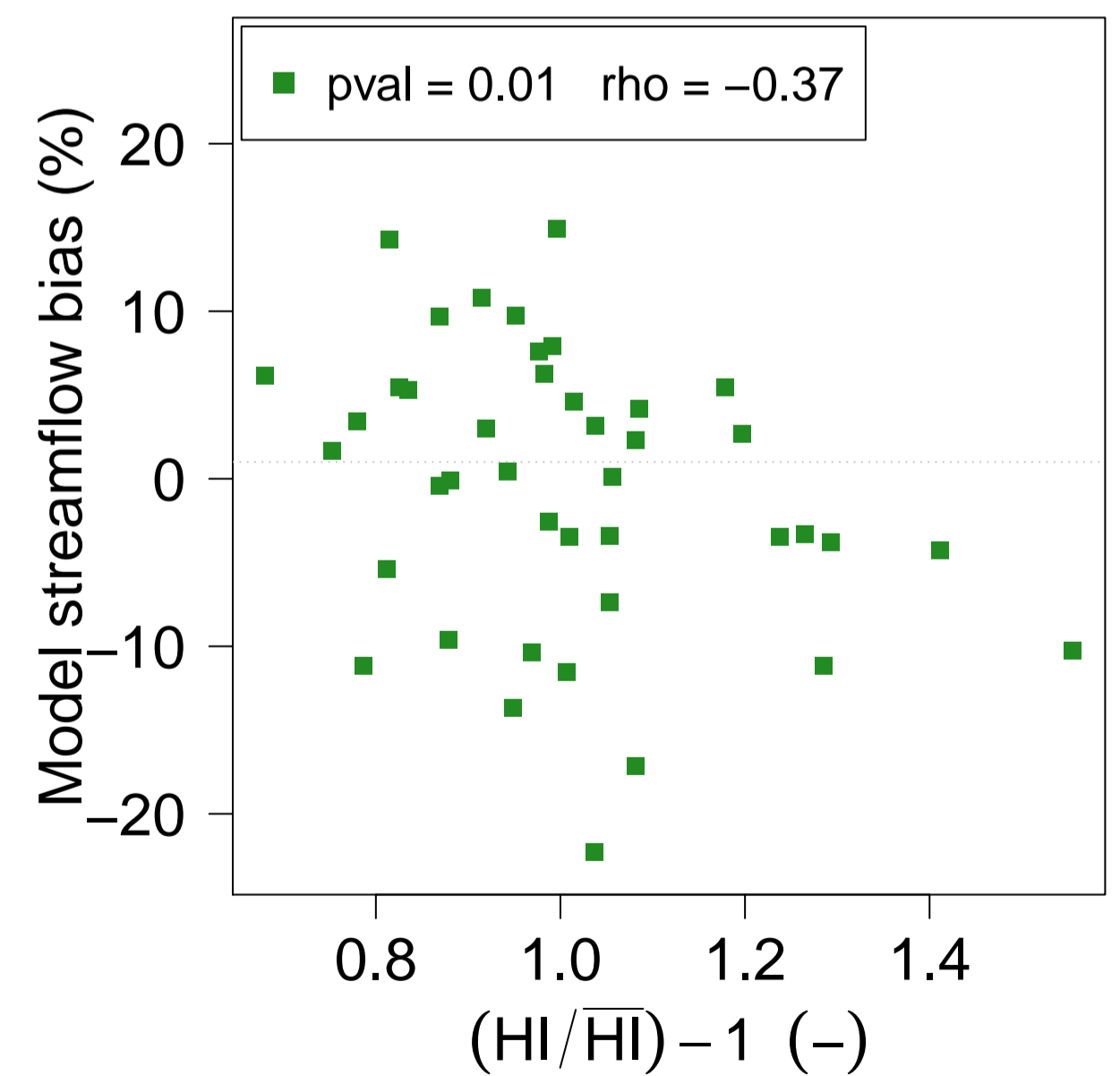
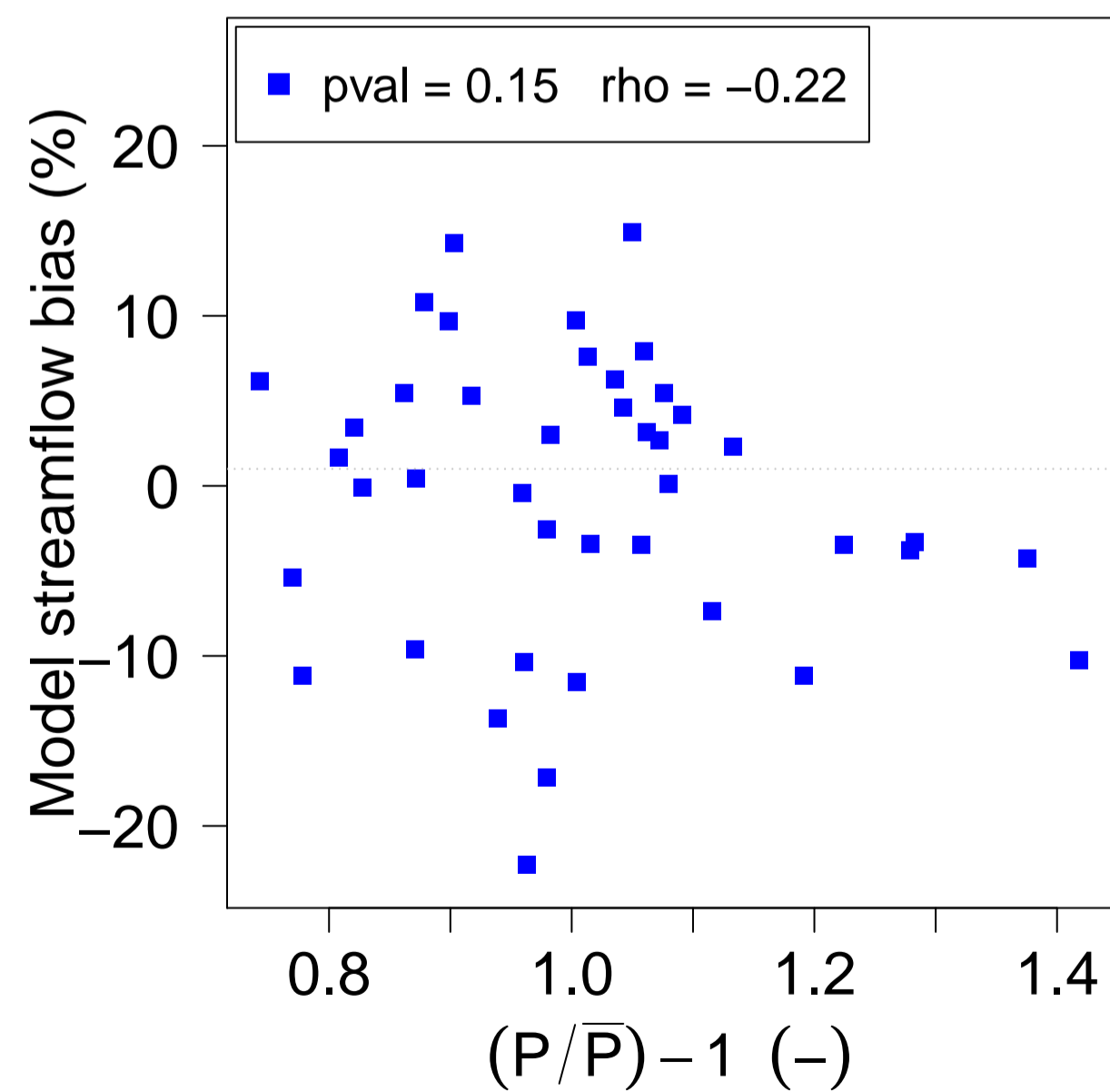
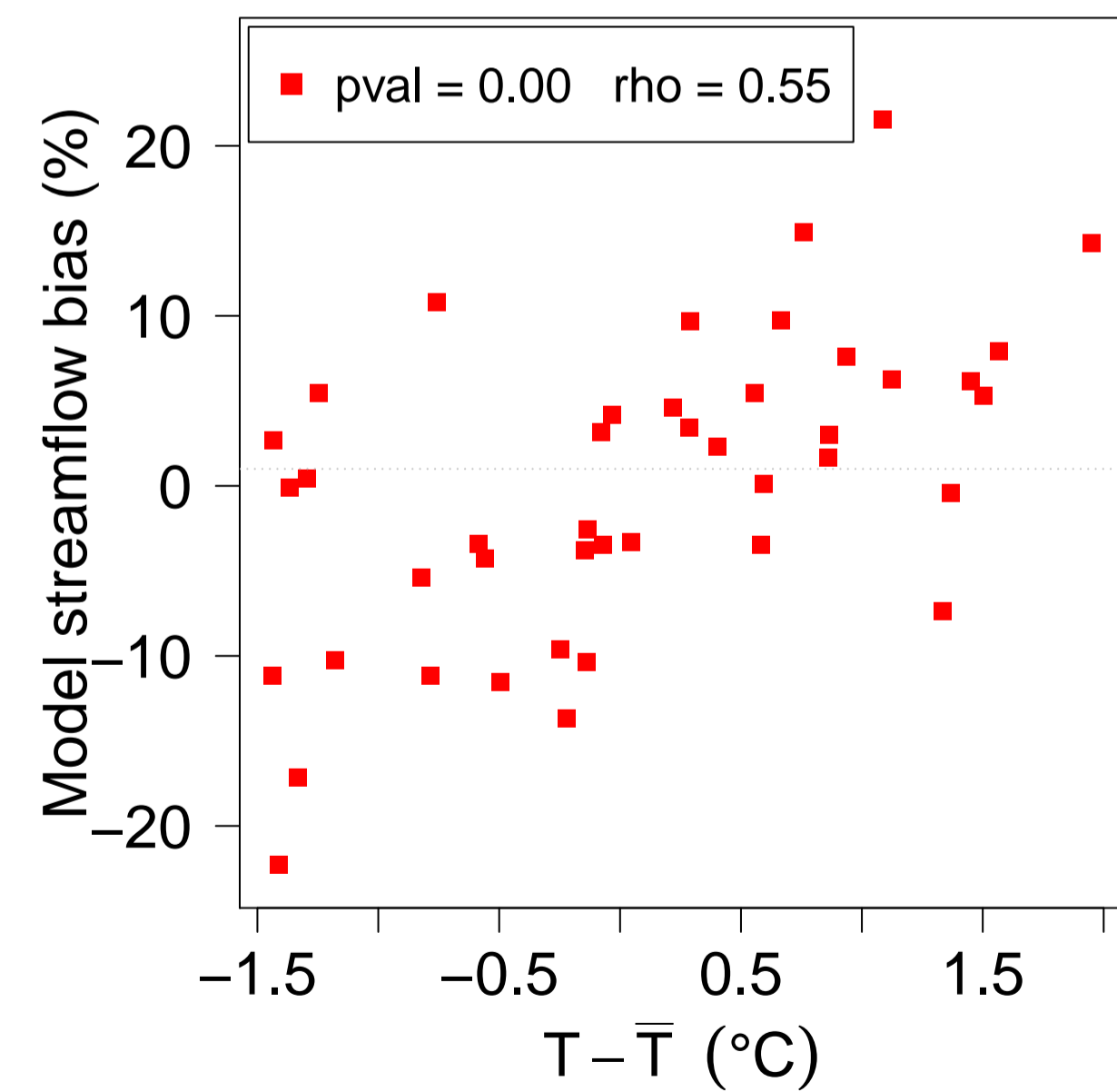
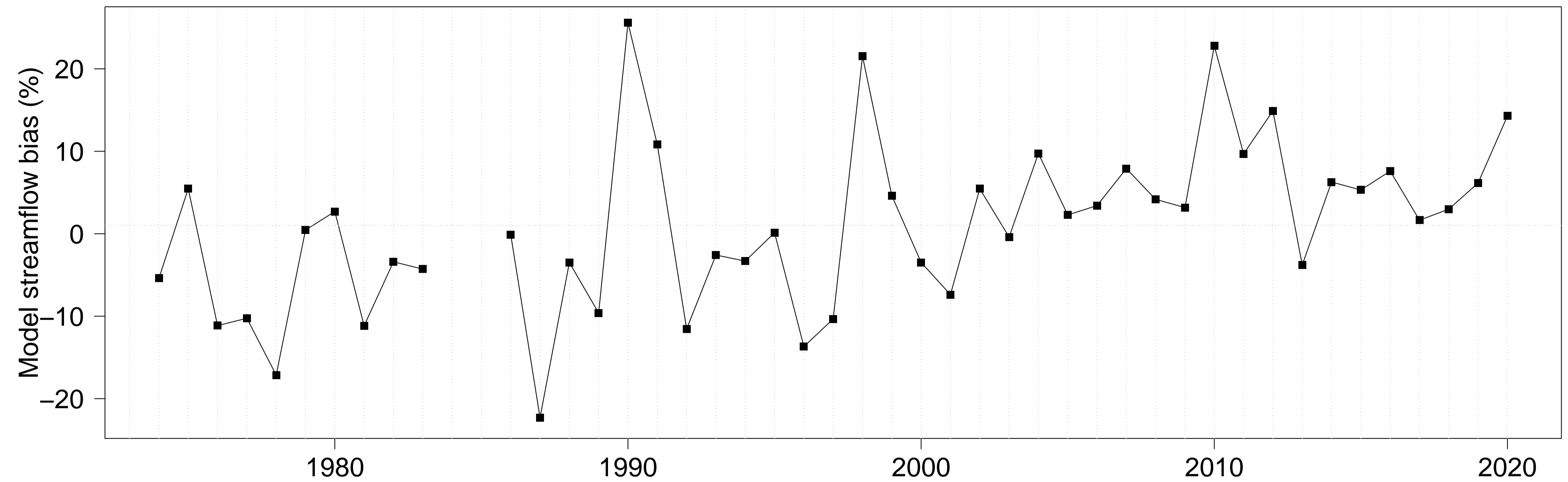


Figure 19. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment U4644010

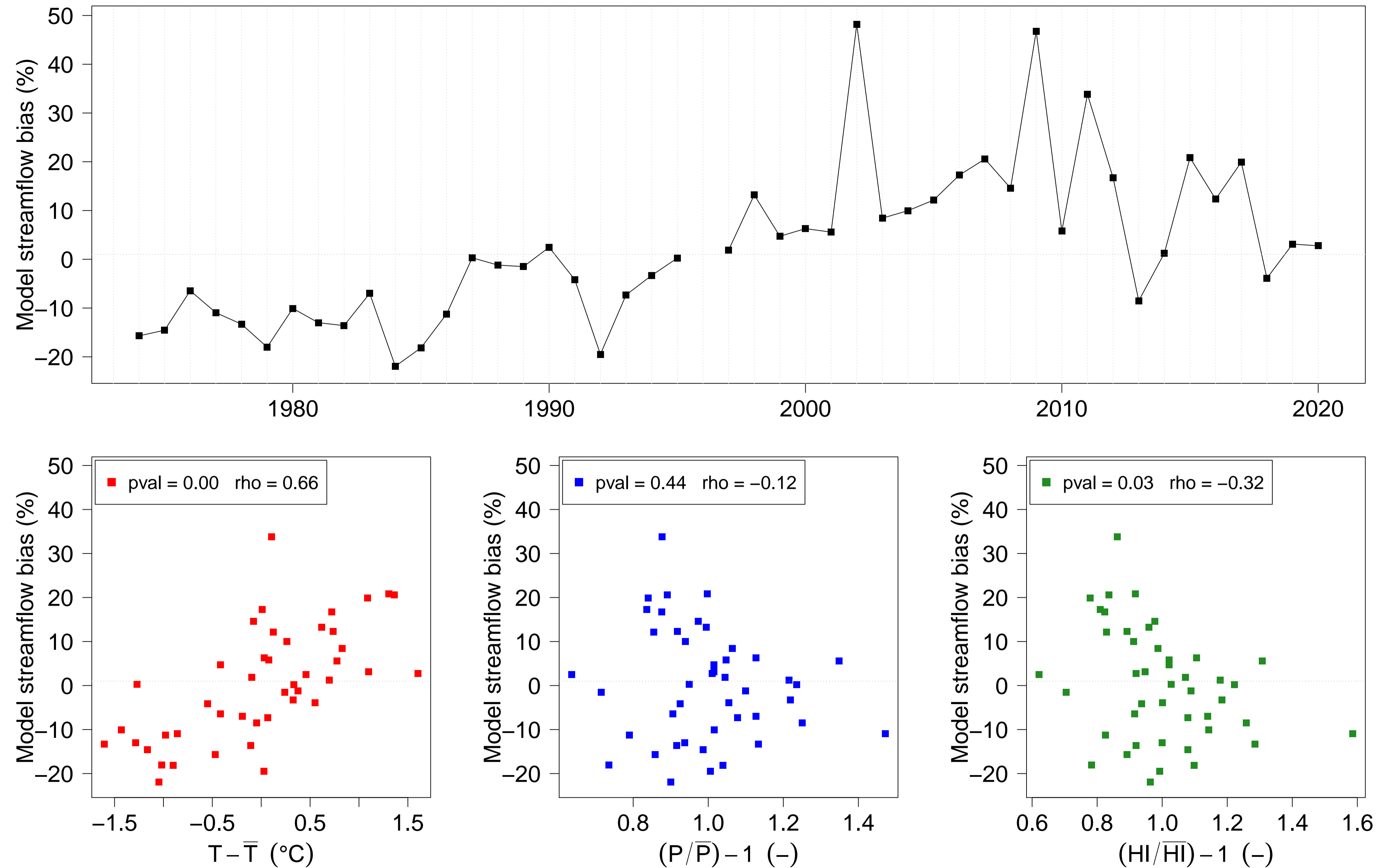


Figure 20. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment V4264010

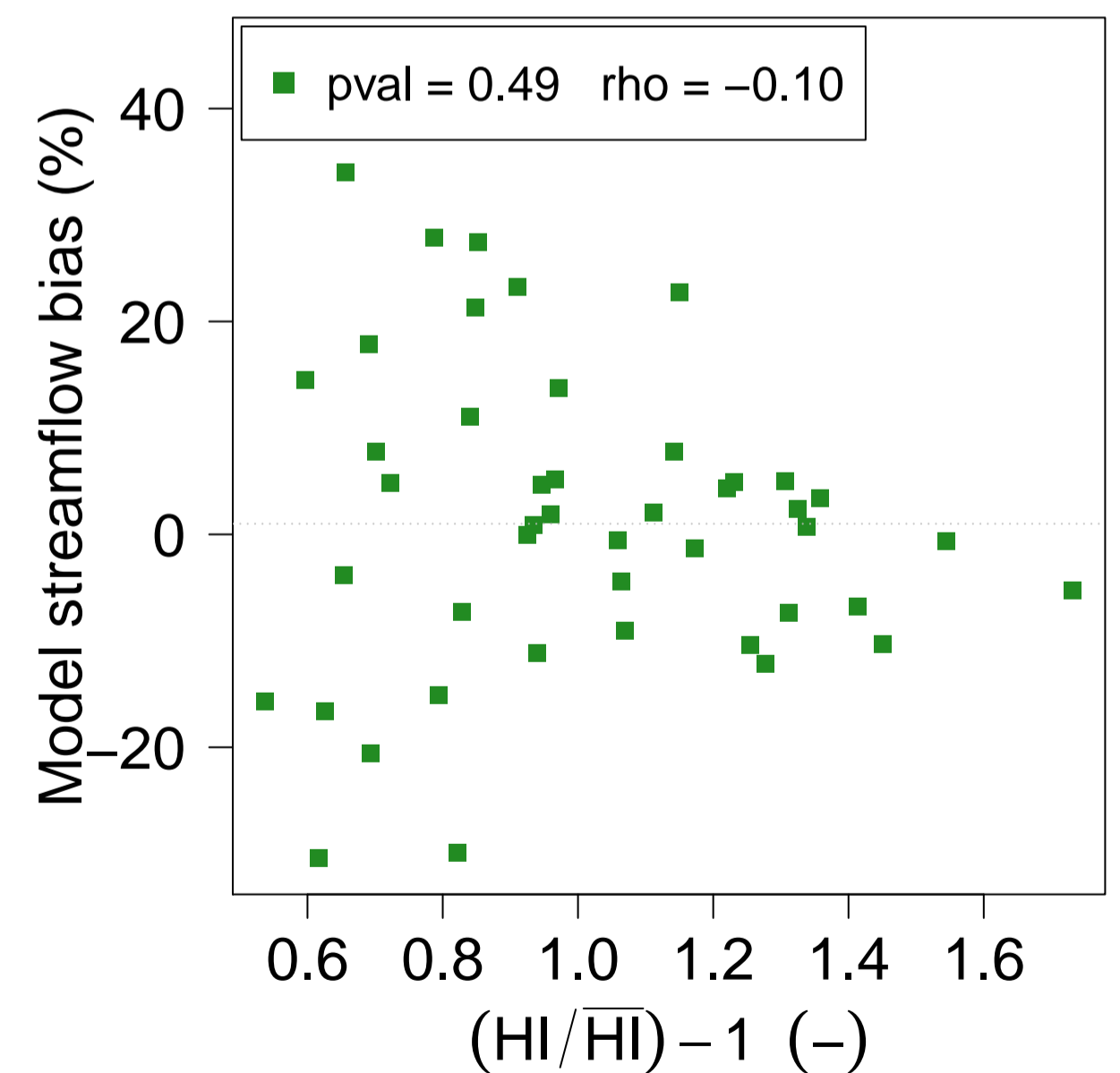
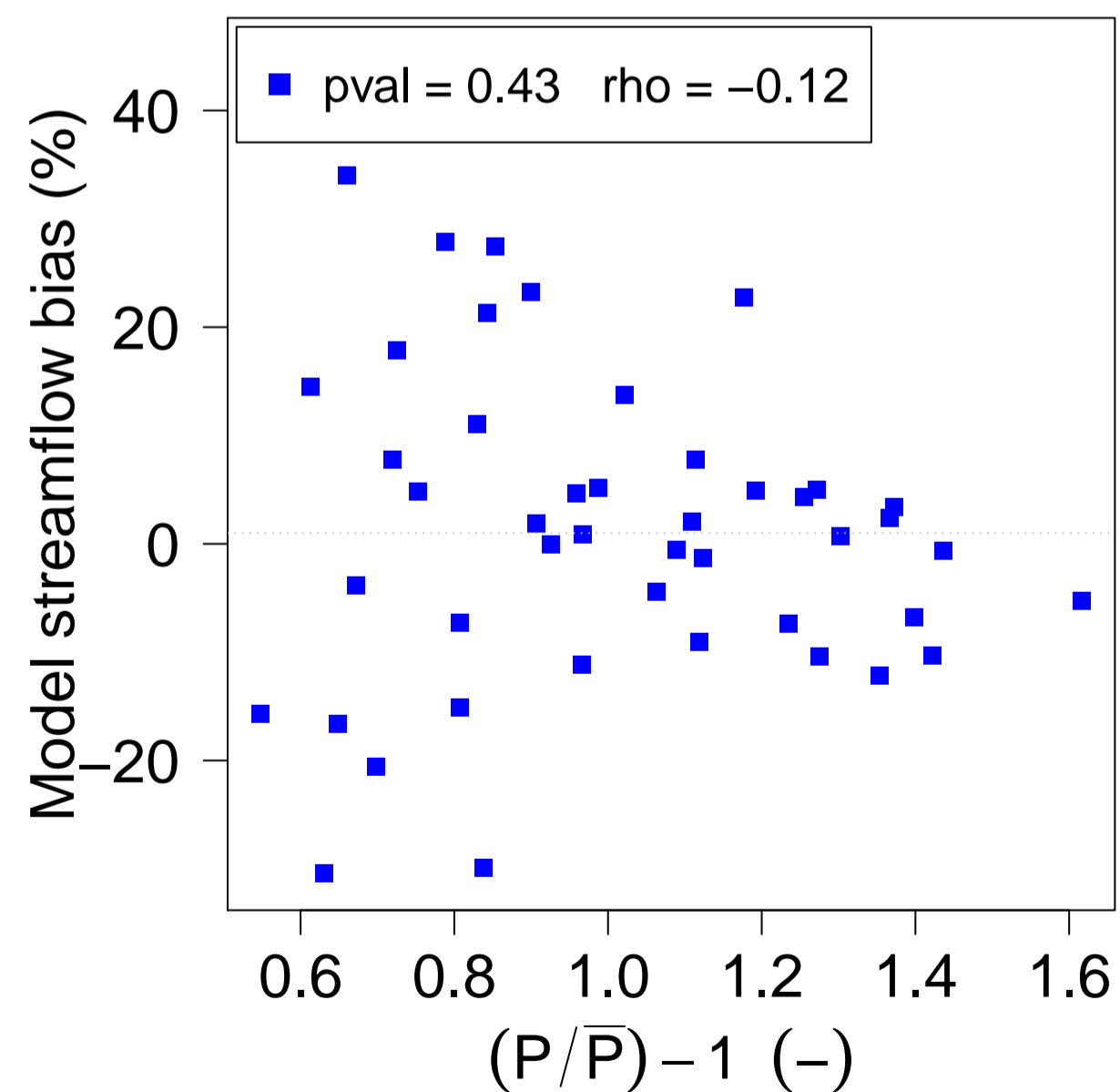
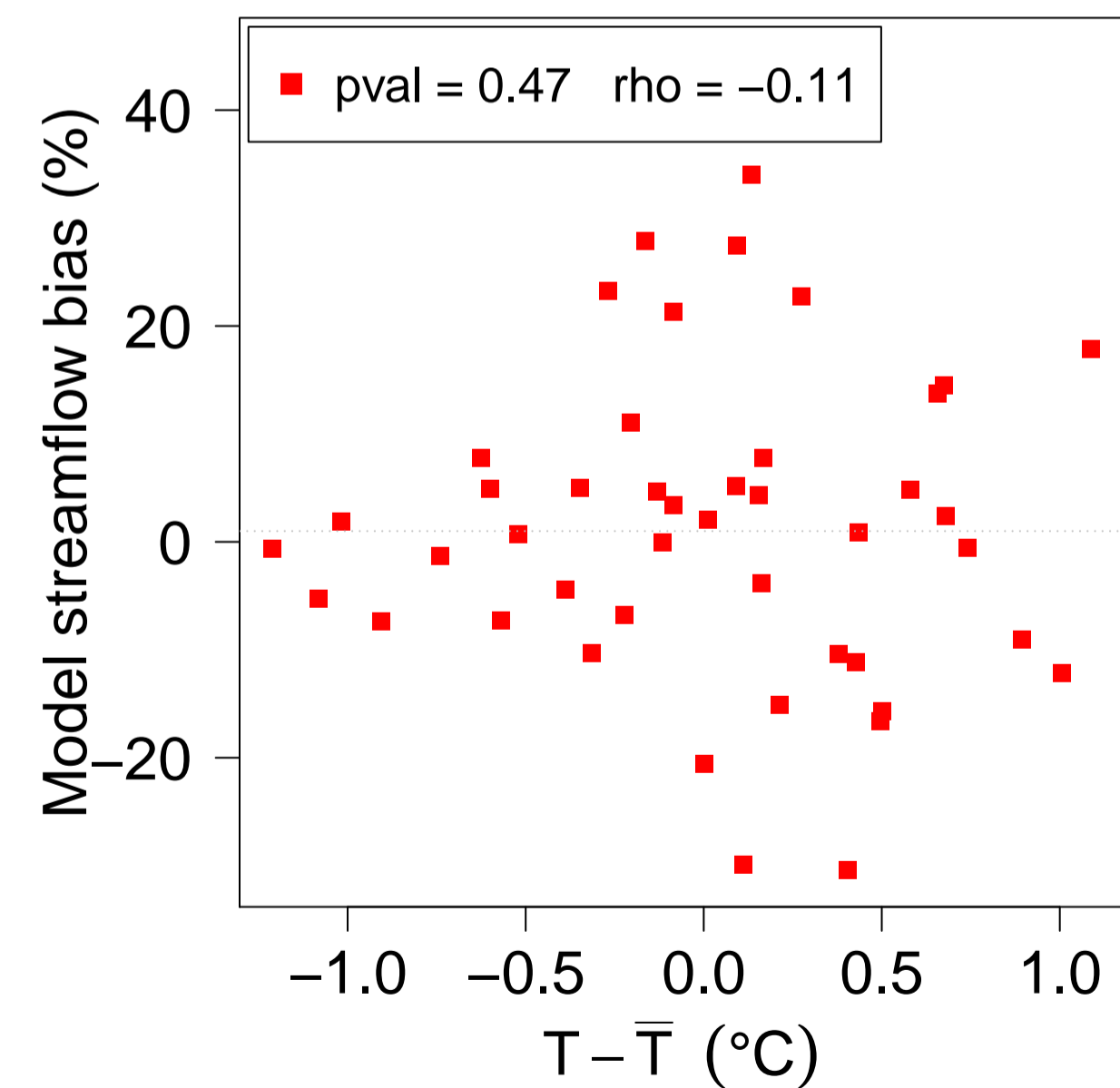
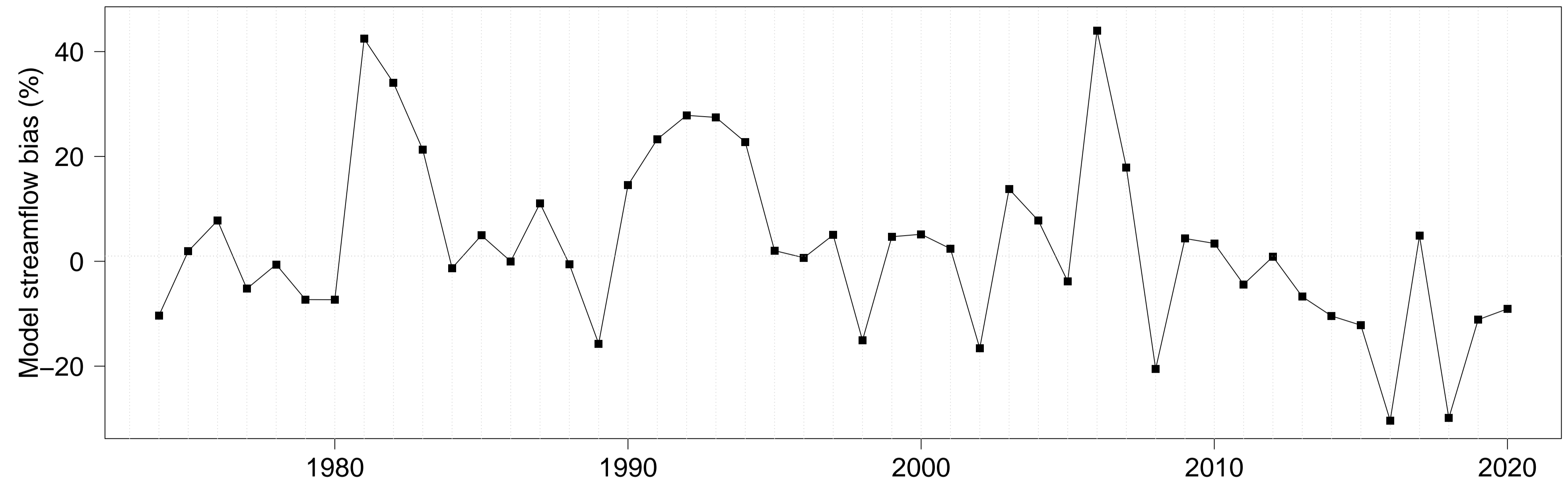


Figure 21. Streamflow annual bias obtained with the RAT function of time (top), temperature absolute anomalies (bottom left) and precipitation P (bottom centre) and humidity index P/E_0 (bottom right) anomalies, for the catchment Y4624010