SUPPLEMENTARY MATERIAL

In the following, the partitioning results for all sites (excluding LO_FR) and all method versions (after Scanlon and Kustas (2010), Scanlon and Sahu (2008), and Thomas et al. (2008); see text for description)) are shown including E_{soil} estimations based on Beer's law, R_{soil} chamber measurements, and partitioning results after Reichstein et al. (2005).

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Scanlon, T.M., and Kustas, W.P.: Partitioning carbon dioxide and water vapor fluxes using correlation analysis. Agric. For. Meteorol. 150 (1), 89-99, https://doi.org/10.1016/j.agrformet.2009.09.005, 2010.

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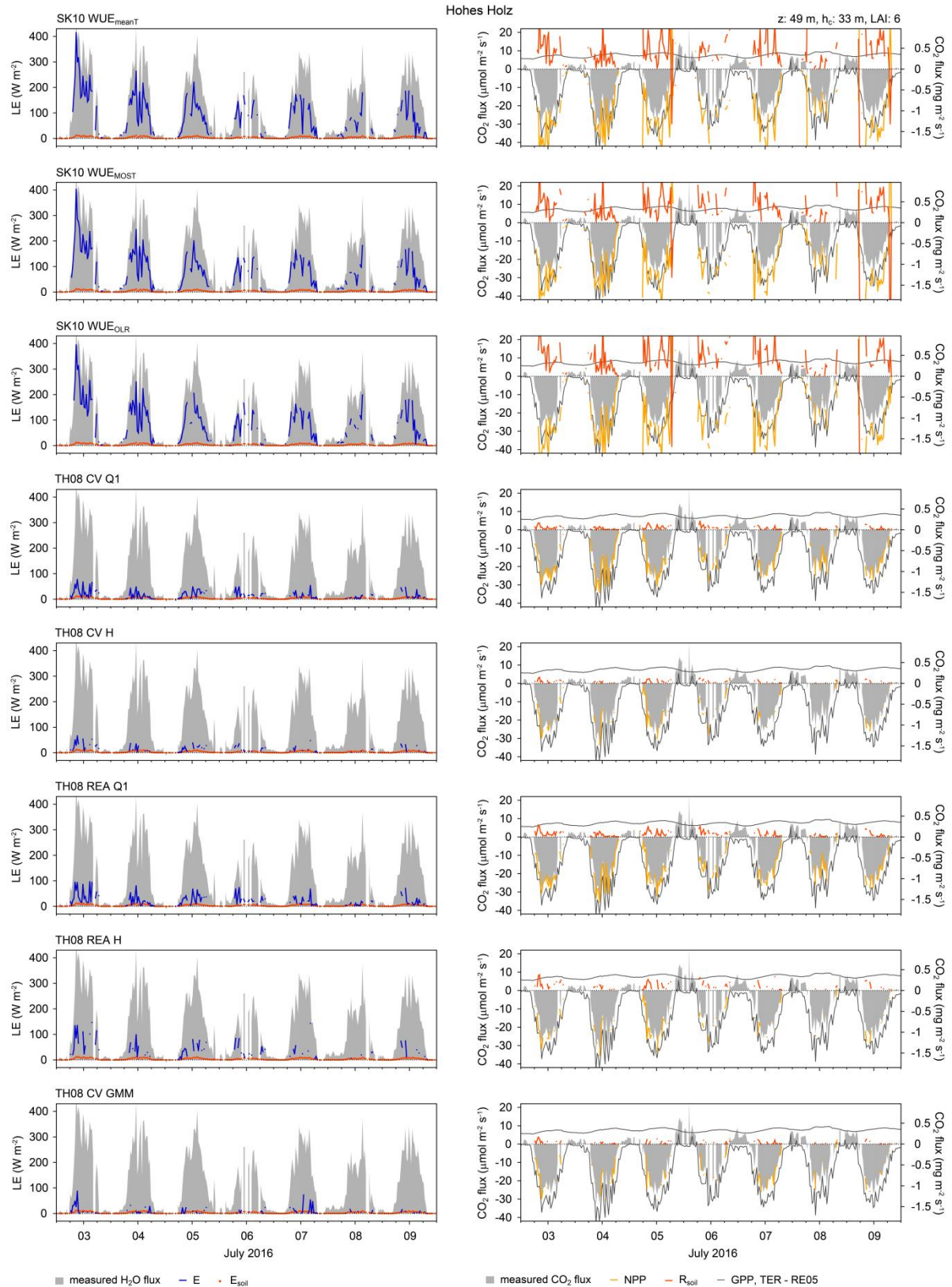
Figure S1: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Hohes Holz study site (forest) in Germany and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) are also included (LE: latent heat flux; E: evaporation; E_soil: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R_soil: soil respiration; z: measurement height; h_c: canopy height; LAI: leaf area index).
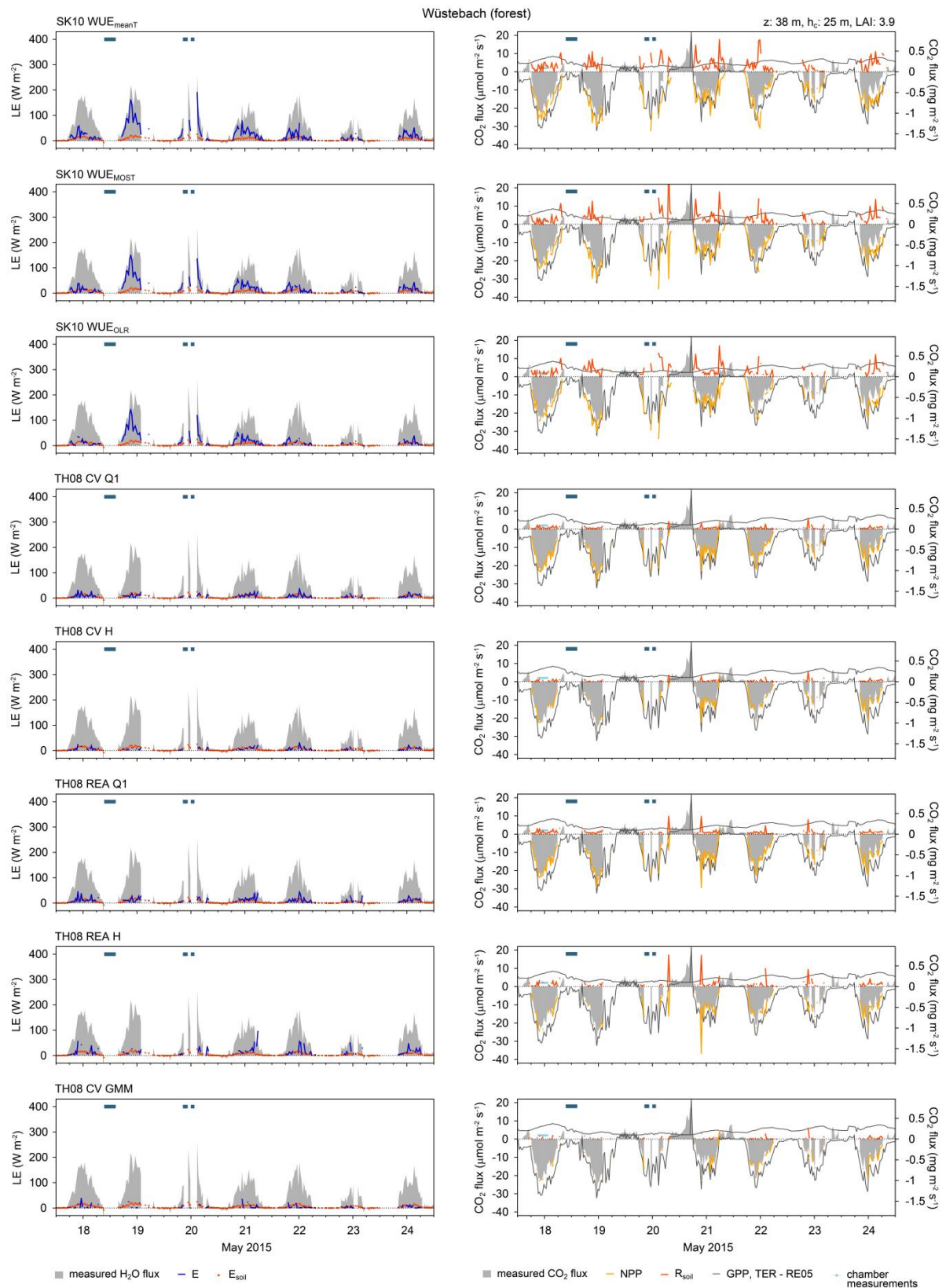
Figure S2: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Wüstebach study site (forest) in Germany and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) and R$_{soil}$ chamber measurements are also included (LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index; blue bars: precipitation events).
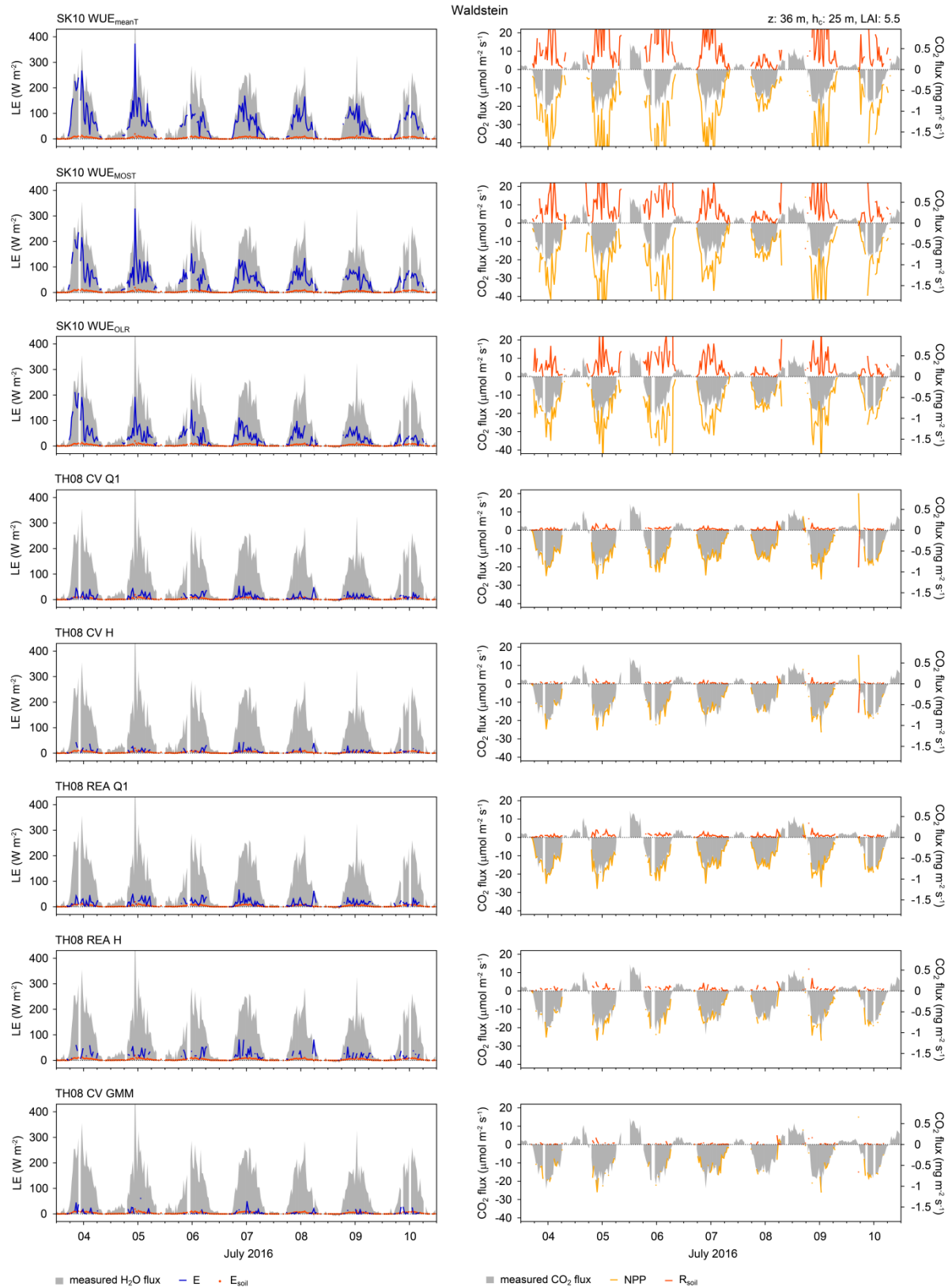
Figure S3: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Waldstein study site (forest) in Germany and for every method version (see Chapter 4 for description; LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; NPP: net primary production; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index).
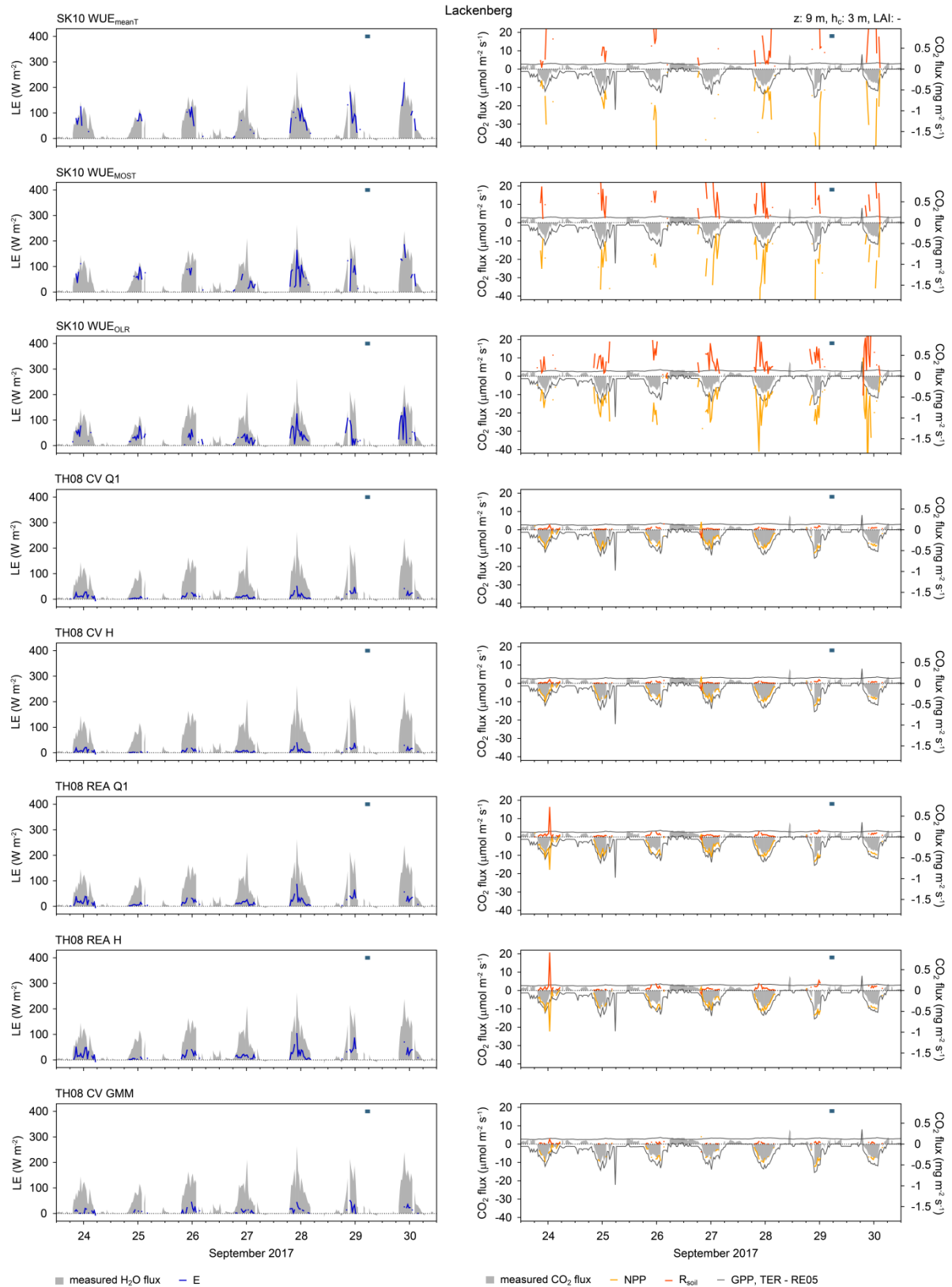
Figure S4: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Lackenberg study site (forest) in Germany and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) are also included (LE: latent heat flux; E: evaporation; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R_{soil}: soil respiration; z: measurement height; h_c: canopy height; LAI: leaf area index; blue bars: precipitation events).
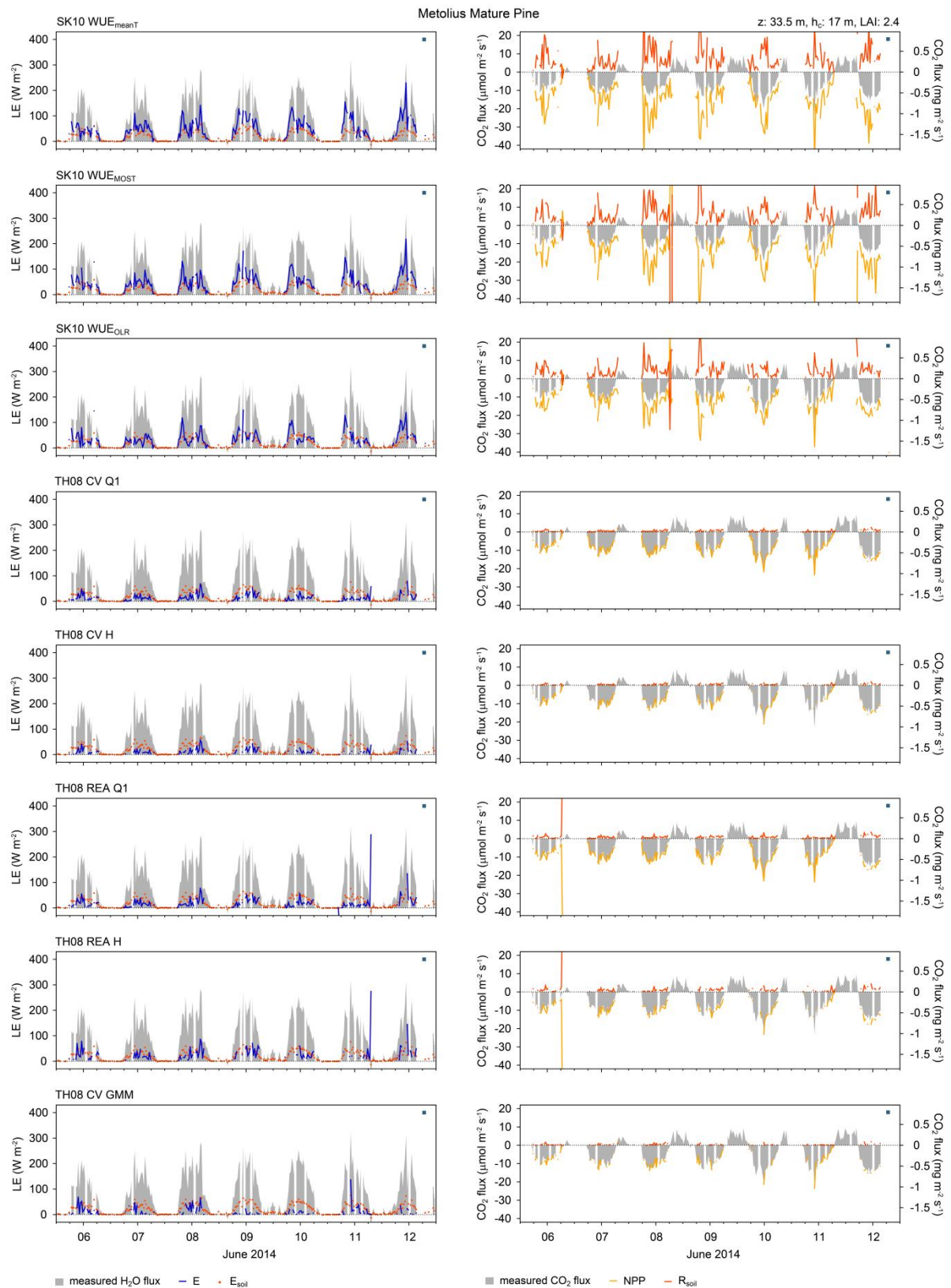
Figure S5: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Metolius Mature Pine study site (forest) in United States and for every method version (see Chapter 4 for description; LE: latent heat flux; E: evaporation; E_soil: estimated evaporation based on Beer's law; NPP: net primary production; R_soil: soil respiration; z: measurement height; h_c: canopy height; LAI: leaf area index; blue bars: precipitation events).
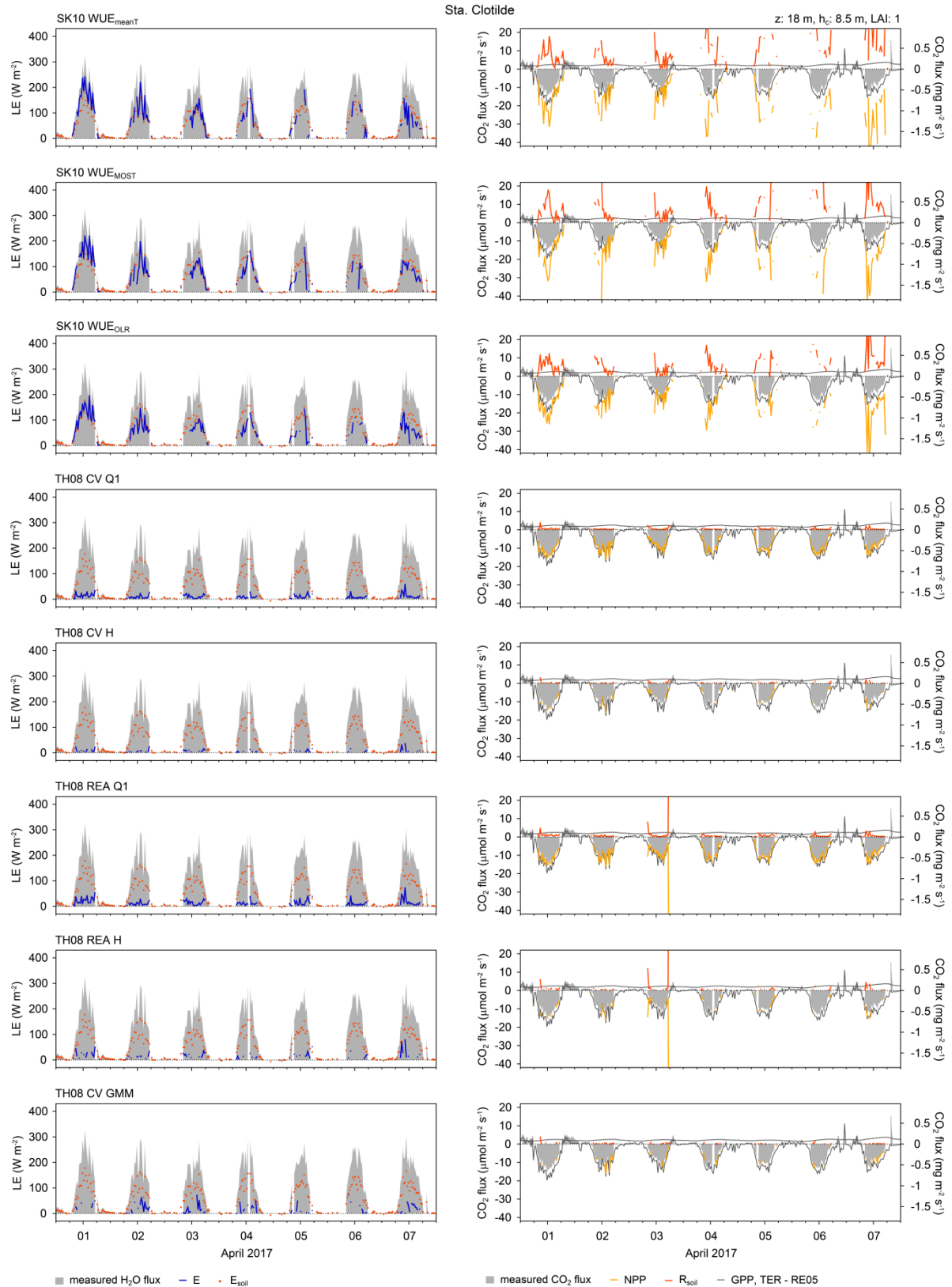
Figure S6: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Sta. Clotilde study site (forest) in Spain and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) are also included (LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index).
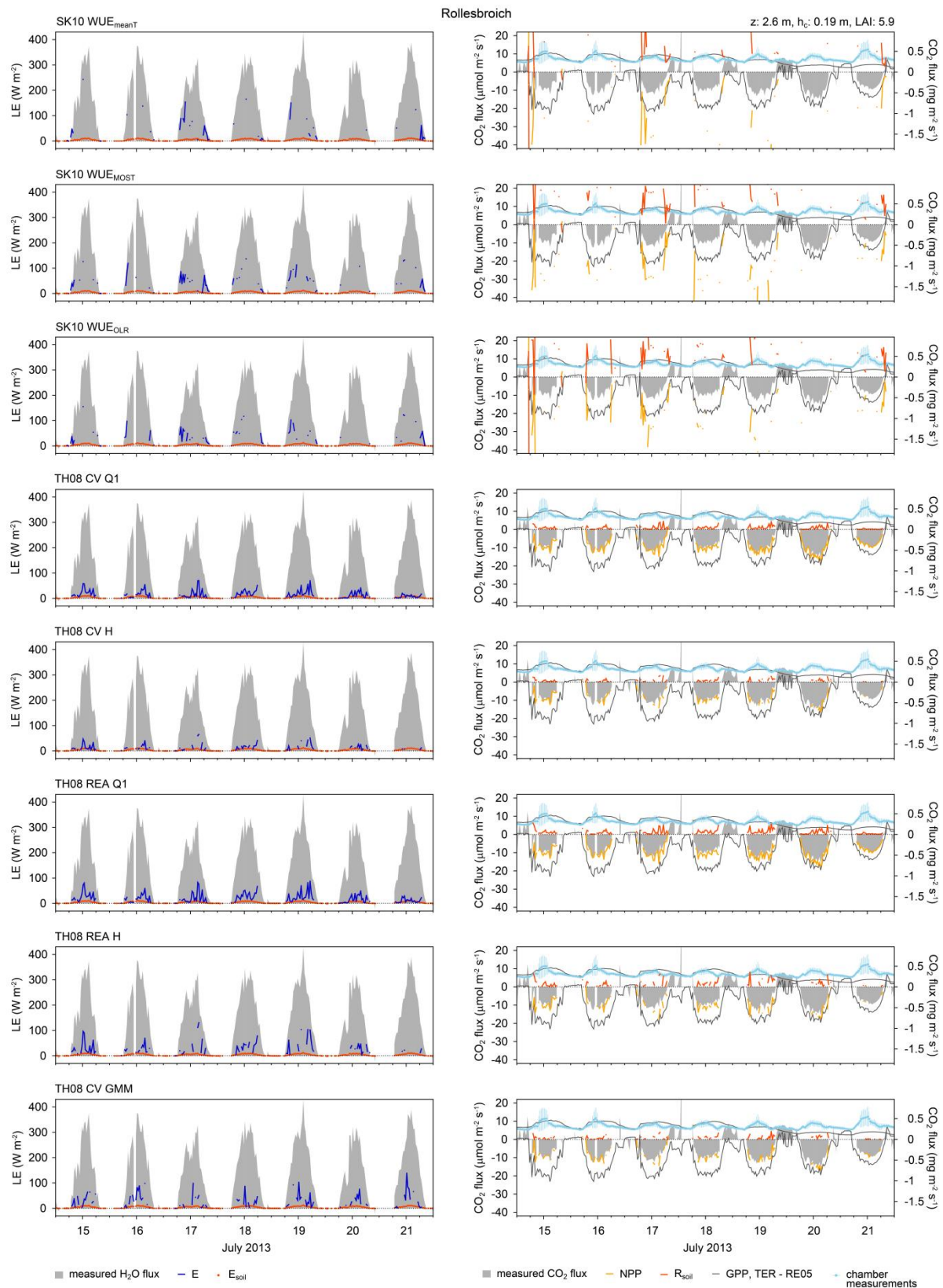
Figure S7: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Rollesbroich study site (grassland) in Germany and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) and R$_{soil}$ chamber measurements are also included (LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index).
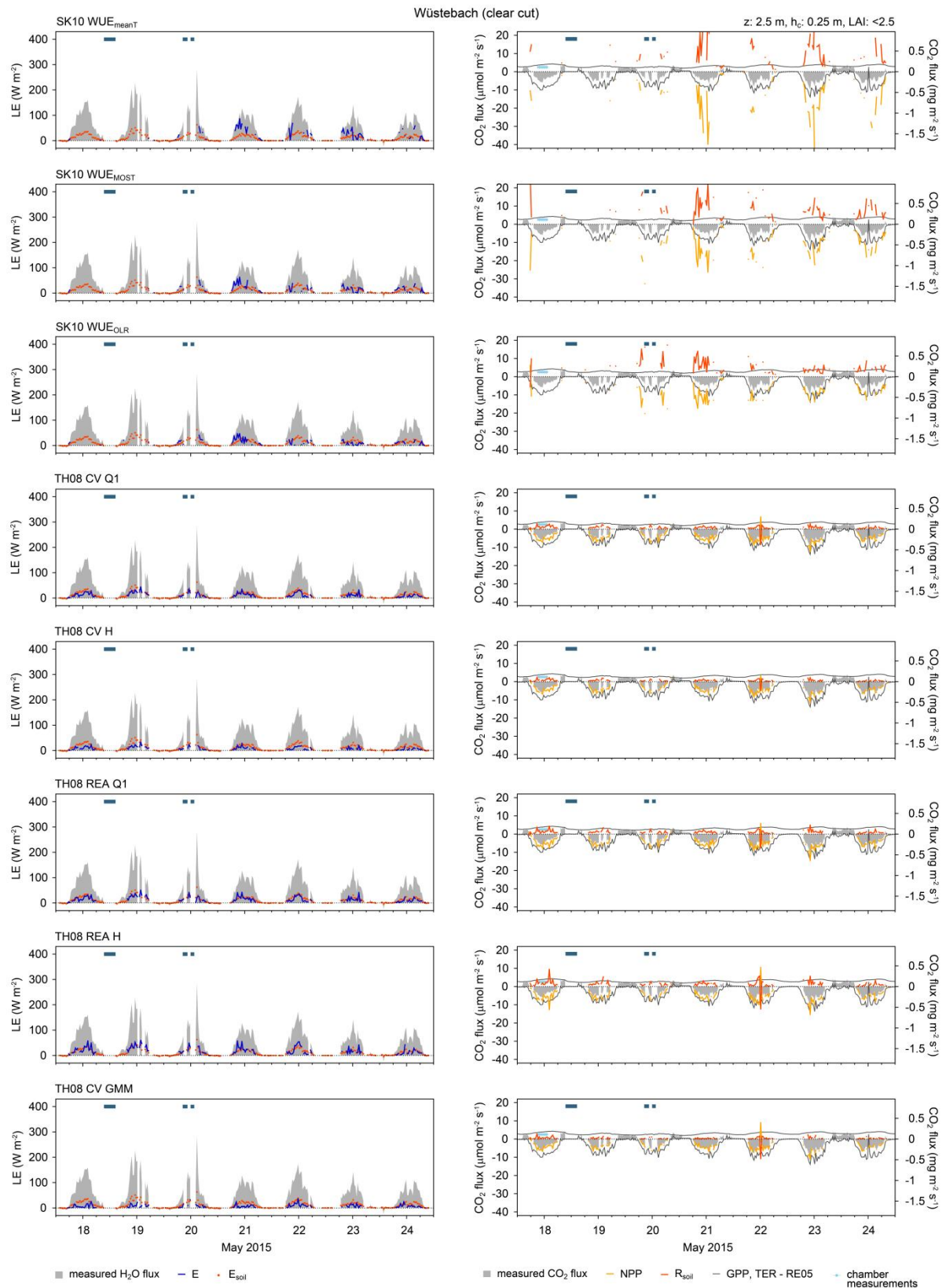
Figure S8: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Wüstebach study site (clear cut) in Germany and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) and R_soil chamber measurements are also included (LE: latent heat flux; E: evaporation; E_soil: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R_soil: soil respiration; z: measurement height; h_c: canopy height; LAI: leaf area index; blue bars: precipitation events).
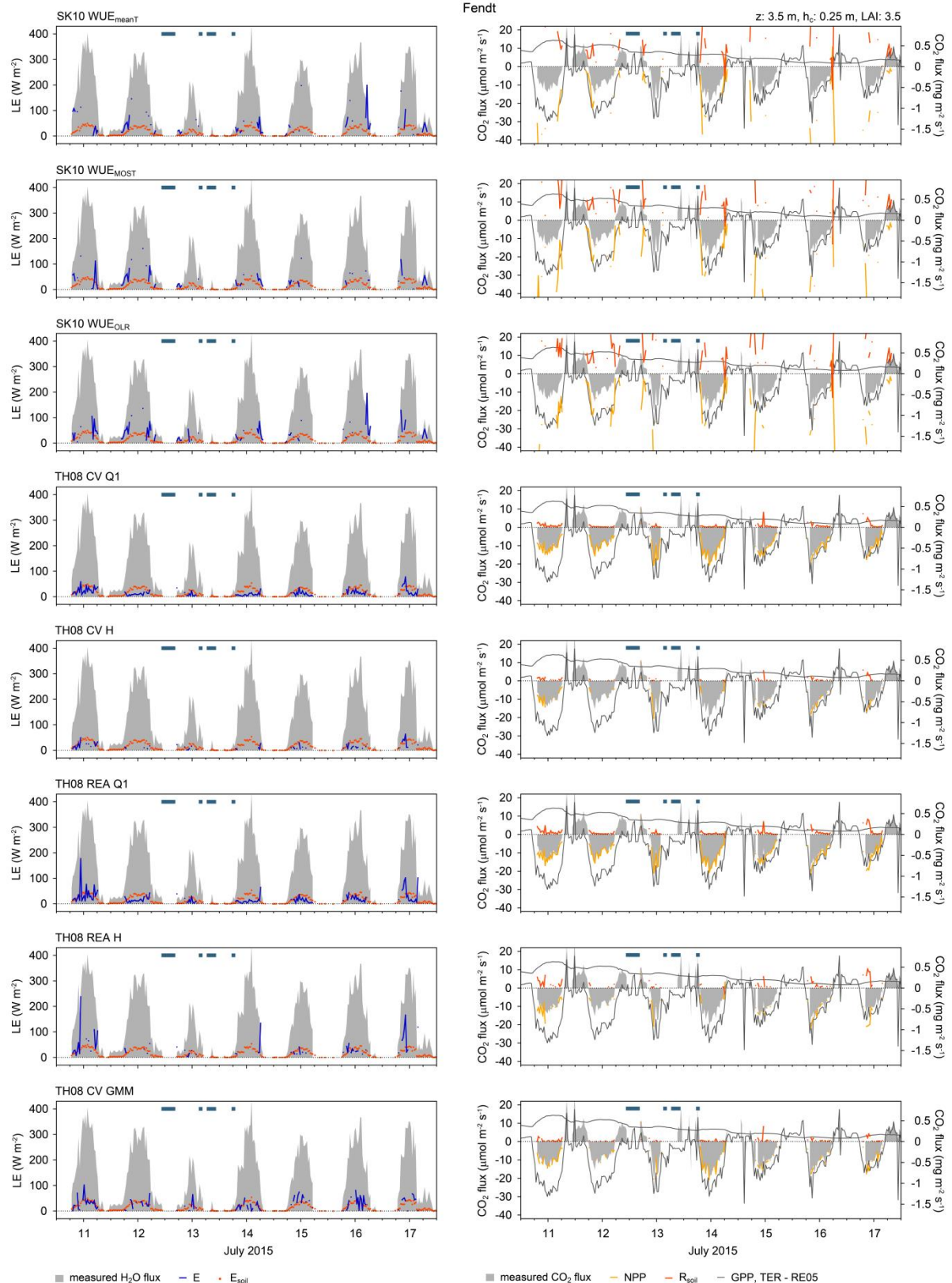
Figure S9: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Fendt study site (grassland) in Germany and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) are also included (LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index; blue bars: precipitation events).
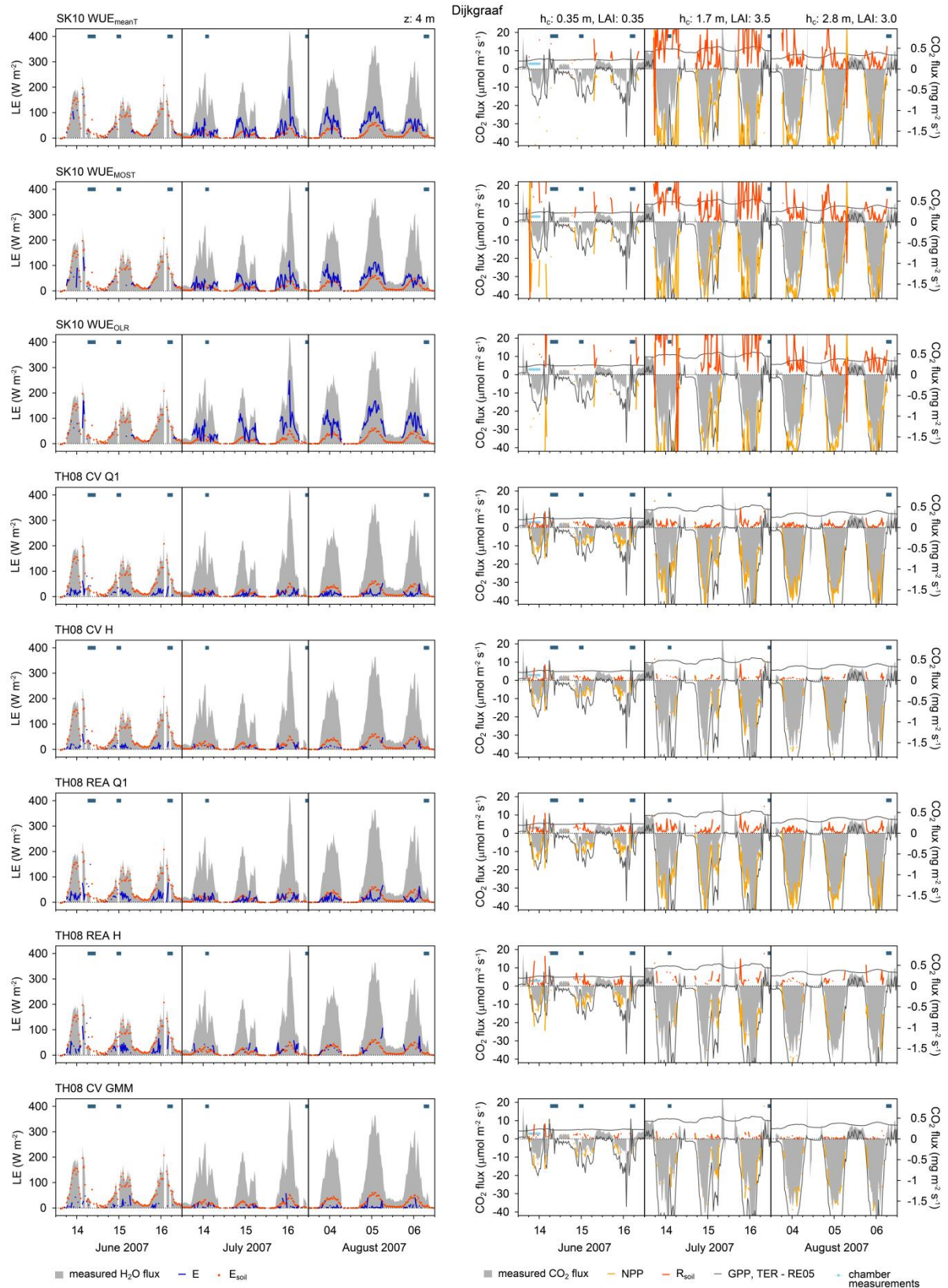
Figure S10: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Dijkgraaf study site (cropland, maize) in The Netherlands and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) and R$_{soil}$ chamber measurements are also included (LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index; blue bars: precipitation events).
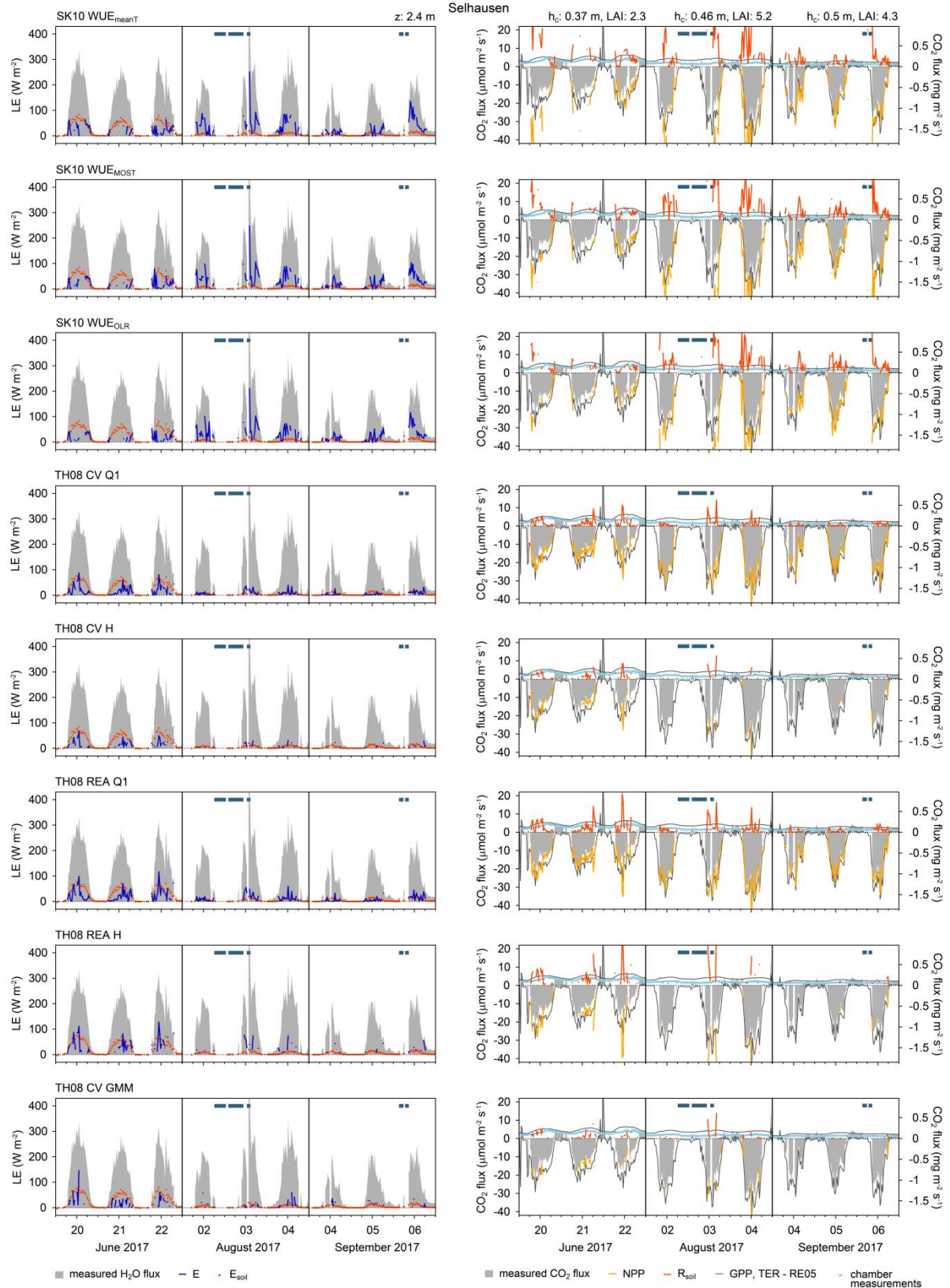
Figure S11: Source partitioning results of H$_2$O (left) and CO$_2$ (right) fluxes in half-hourly time steps for the Selhausen study site (cropland, sugar beet) in Germany and for every method version (see Chapter 4 for description). CO$_2$ flux estimates by Reichstein et al. (2005; RE05) and R$_{soil}$ chamber measurements are also included (LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index; blue bars: precipitation events).
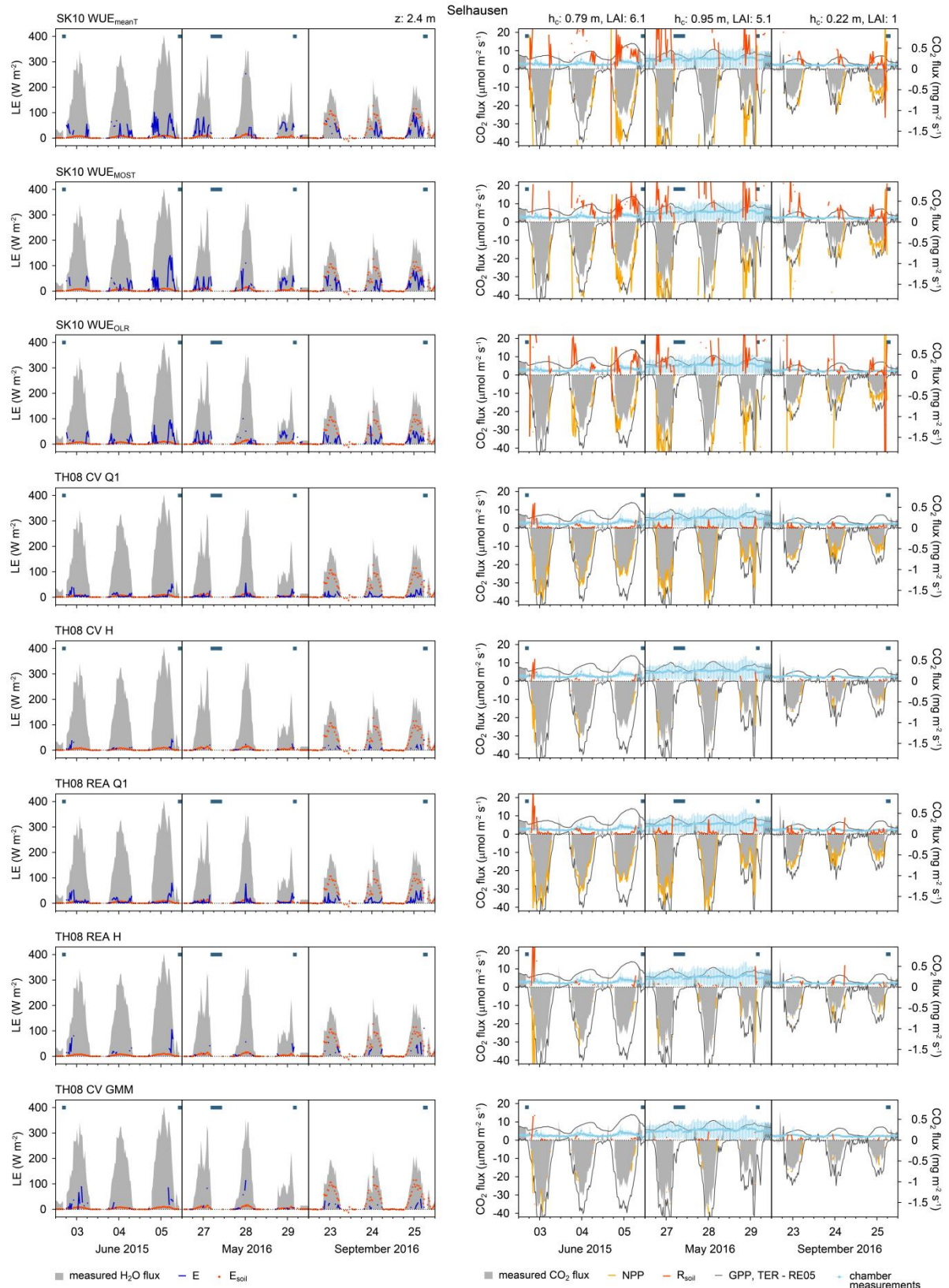
Figure S12: Source partitioning results of H₂O (left) and CO₂ (right) fluxes in half-hourly time steps for the Selhausen study site (cropland, 06/2015: winter wheat, 05/2016: barley, 09/2016: intercrop) in Germany and for every method version (see Chapter 4 for description). CO₂ flux estimates by Reichstein et al. (2005; RE05) and R$_{soil}$ chamber measurements are also included (LE: latent heat flux; E: evaporation; E$_{soil}$: estimated evaporation based on Beer's law; GPP: gross primary production; NPP: net primary production; TER: total ecosystem respiration; R$_{soil}$: soil respiration; z: measurement height; h$_c$: canopy height; LAI: leaf area index; blue bars: precipitation events).