Supporting Information

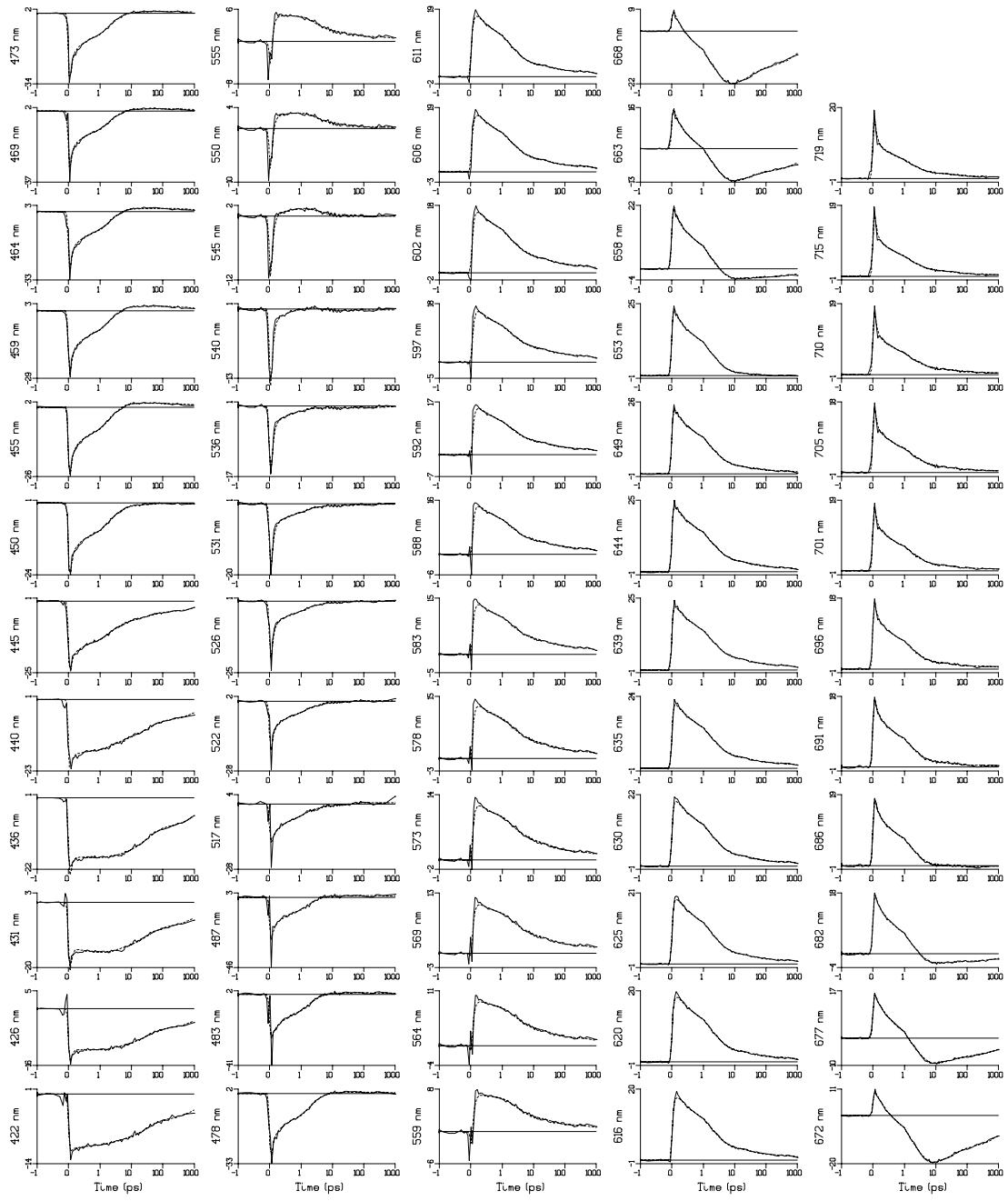

Figure S 1
Selected traces after 500 nm excitation at wavelengths (indicated as ordinate labels, vertical unit is mOD) between 420 and 720 nm. Dashed lines indicate fit. The time axis is linear till 1 ps, and logarithmic thereafter.

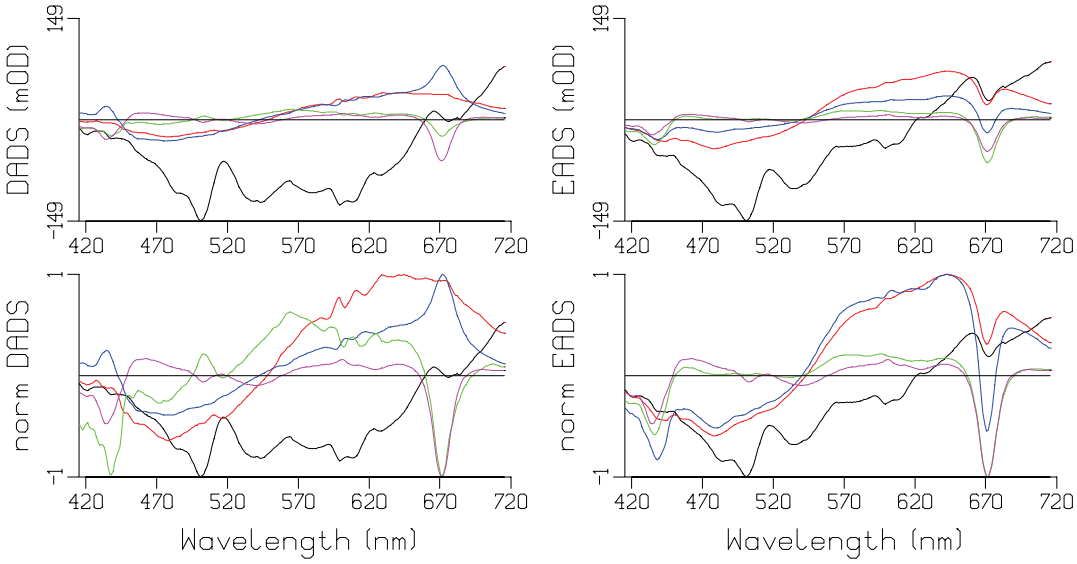

Figure S 2
Top row: DADS and EADS estimated from magic-angle pump-probe data after 475 nm excitation measured in a 20 ps time range. Bottom row shows normalized DADS and EADS. Key: 0.04 ps (black), 0.6 ps (red), 2.4 ps (blue), 20 ps (green), 2 ns fixed (magenta).

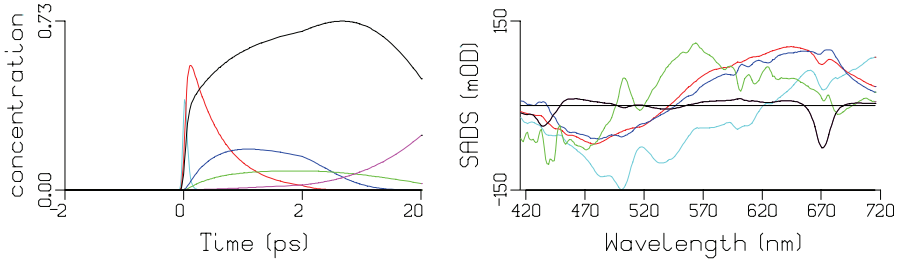

Figure S 3
Concentration profiles (left) and SADS estimated from magic-angle pump-probe data after 475 nm excitation using the kinetic schemes from Figure 4. Key: S_2 (cyan), hot S_1 (red), S_1 (blue), slow S_1 (green), Chl (black), terminal Chl (magenta).

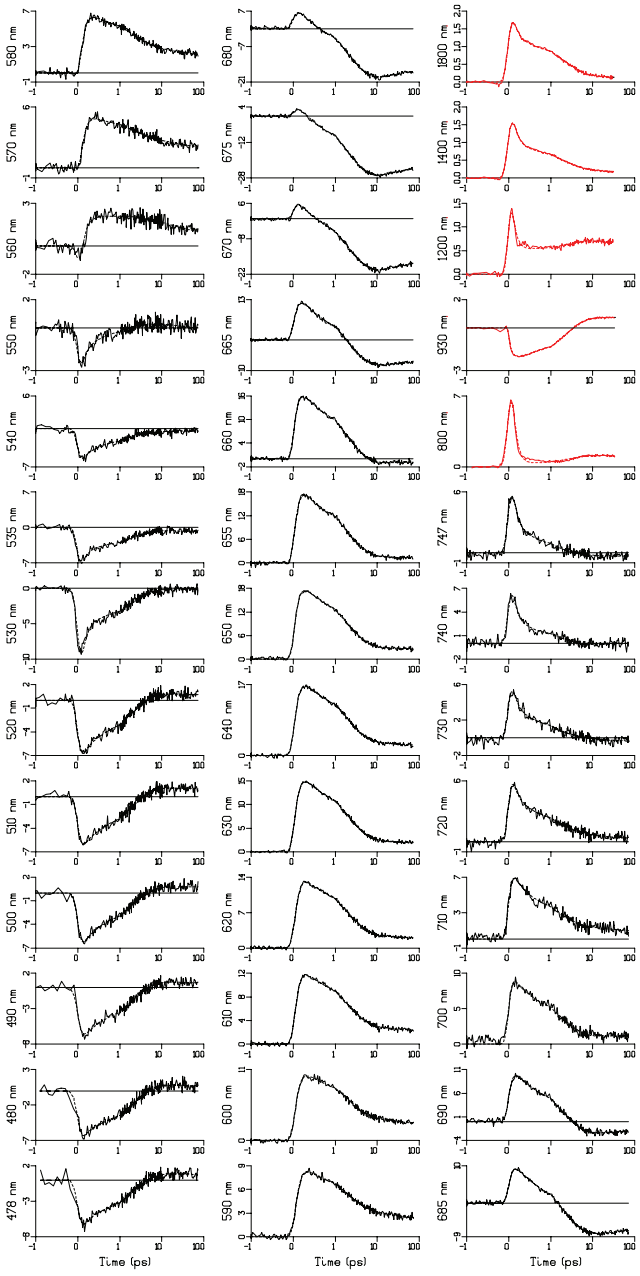

Figure S 4

Selected traces at wavelengths (indicated as ordinate labels, vertical unit is mOD) between 478 and 1800 nm. Dashed lines indicate fit. The five red traces are separate measurements in the near infrared. The time axis is linear till 1 ps, and logarithmic thereafter.

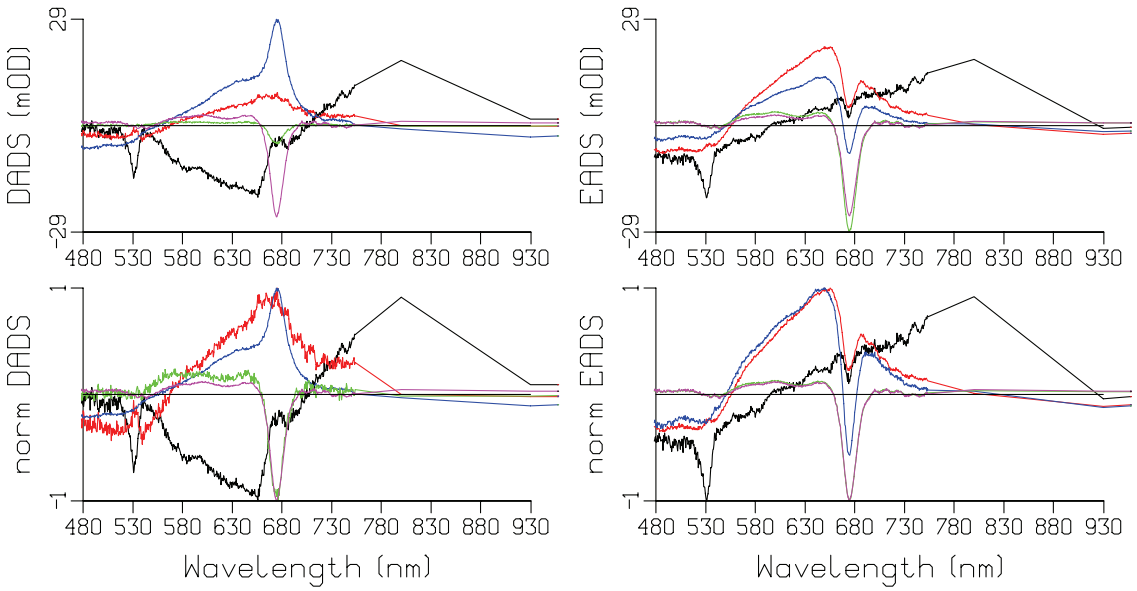

Figure S 5

Top row: DADS and EADS estimated from magic-angle pump-probe data after 535 nm excitation measured in a 72 ps time range. Bottom row shows normalized DADS and EADS. Key: 0.09 ps (black), 0.5 ps (red), 2.4 ps (blue), 20 ps (green), 2 ns fixed (magenta).

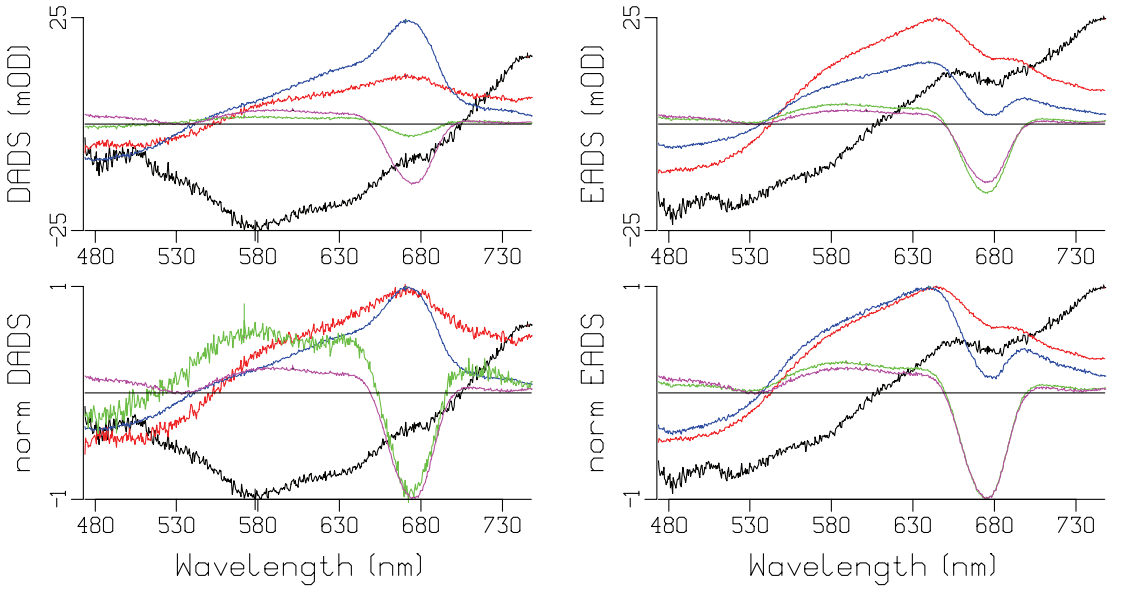

Figure S 6

Top row: DADS and EADS estimated from magic-angle pump-probe data after 490 nm excitation measured in a 72 ps time range. Bottom row shows normalized DADS and EADS. Key: 0.07 ps (black), 0.5 ps (red), 2.5 ps (blue), 21 ps (green), 2 ns fixed (magenta).

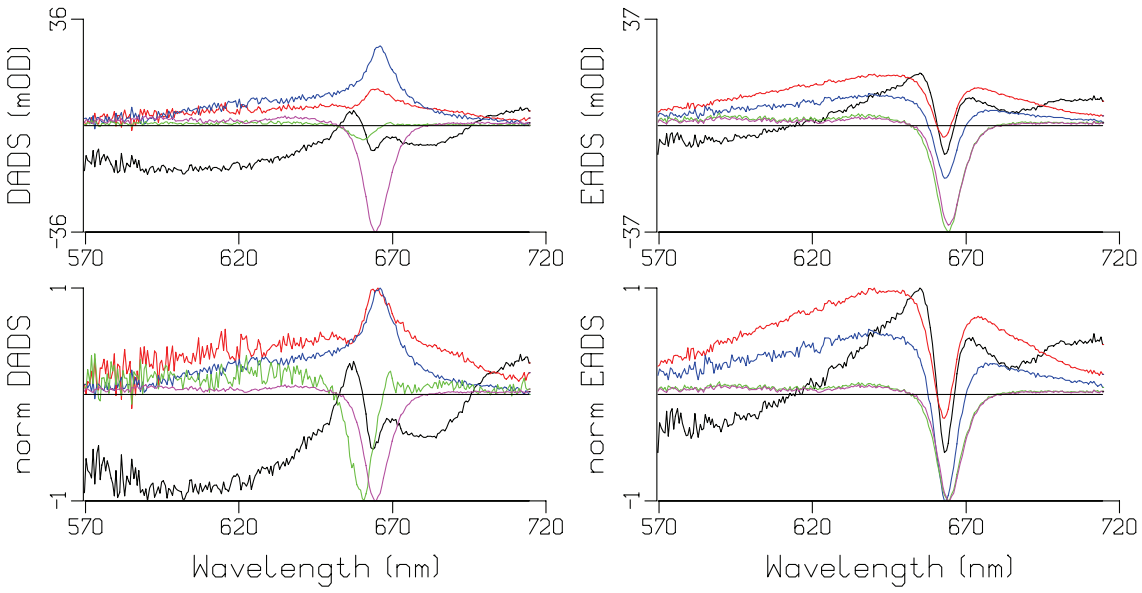

Figure S 7

Top row: DADS and EADS estimated from magic-angle pump-probe data at 77K after 500 nm excitation. Bottom row shows normalized DADS and EADS. Key: 0.06 ps (black), 0.5 ps (red), 2.3 ps (blue), 21 ps (green), 1.2 ns (magenta).

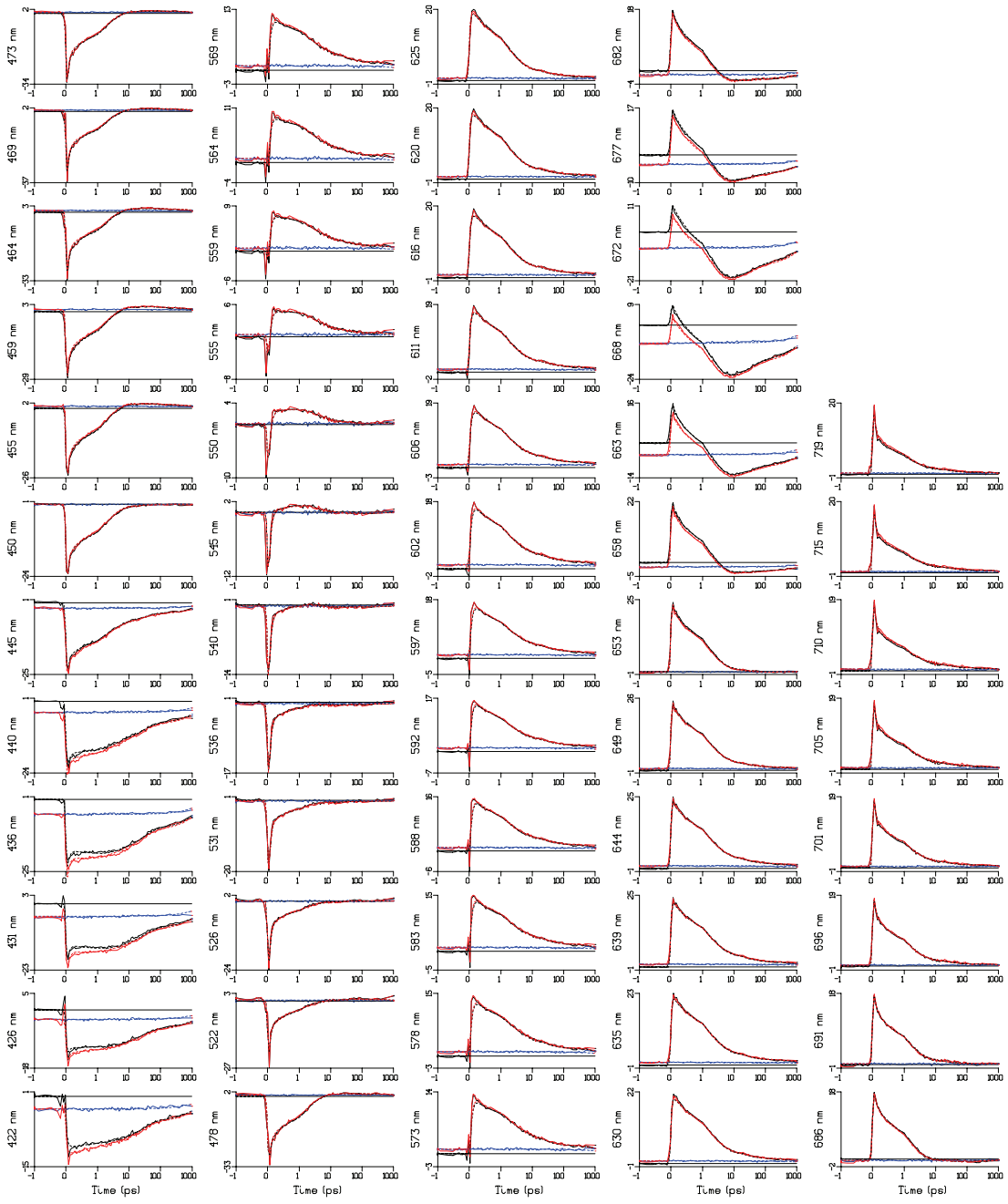

Figure S 8

Selected traces at wavelengths (indicated as ordinate labels, vertical unit is mOD) between 420 and 720 nm. Dashed lines indicate fit. The time axis is linear till 1 ps, and logarithmic thereafter. Black are the ordinary pump-probe traces already depicted in Figure S 1, blue is the prepump signal, which corresponds to Chl*. The red traces are from the 400-nm prepump followed after 300 ps by the 500-nm pump pulse.

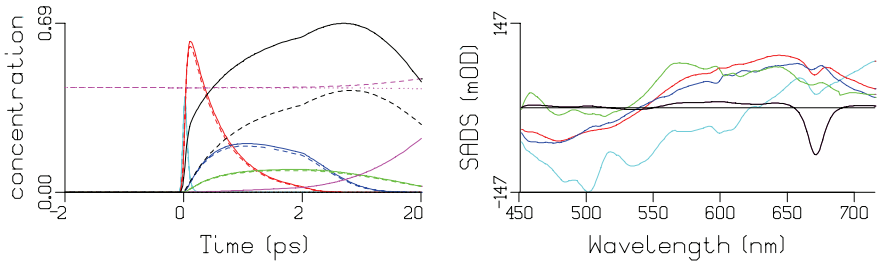

Figure S 9

Concentration profiles (left) and SADS estimated from magic-angle data after 475 nm excitation using the kinetic schemes from Figure 4. The dotted concentrations are from the prepump experiment, the solid lines are from the normal pump-probe experiment, and the dashed lines correspond to the combined prepump-pump-probe experiment. Key: S_2 (cyan), hot S_1 (red), S_1 (blue), slow S_1 (green), Chl (black), terminal Chl (magenta).

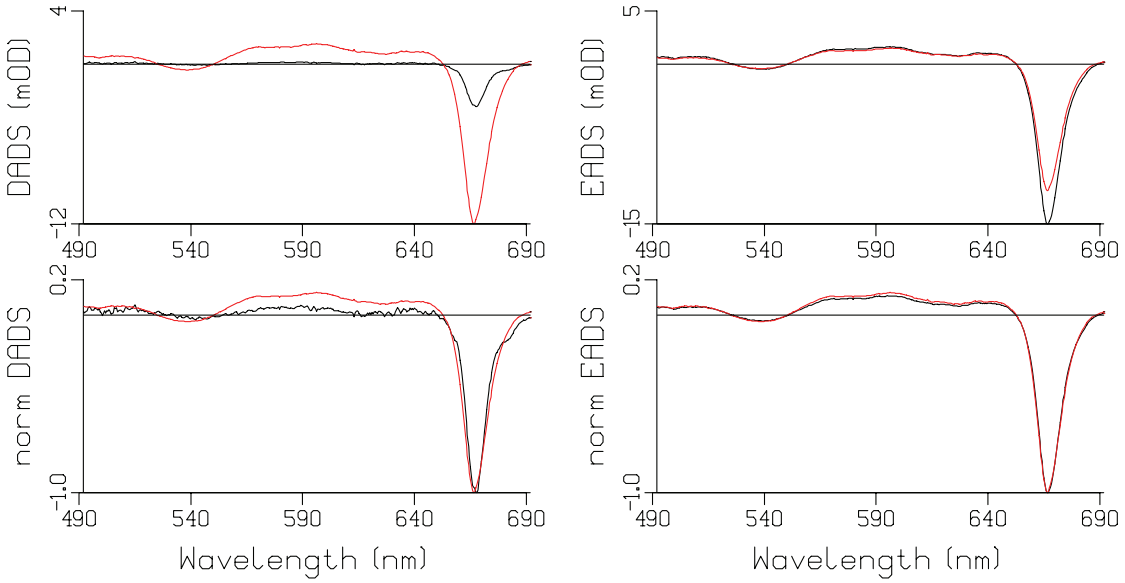

Figure S 10

Top row: DADS and EADS estimated from magic-angle pump-probe data after 670 nm excitation measured in a 1000 ps time range. Bottom row shows normalized DADS and EADS. Key: 13 ps (black), 2.4 ns (red).

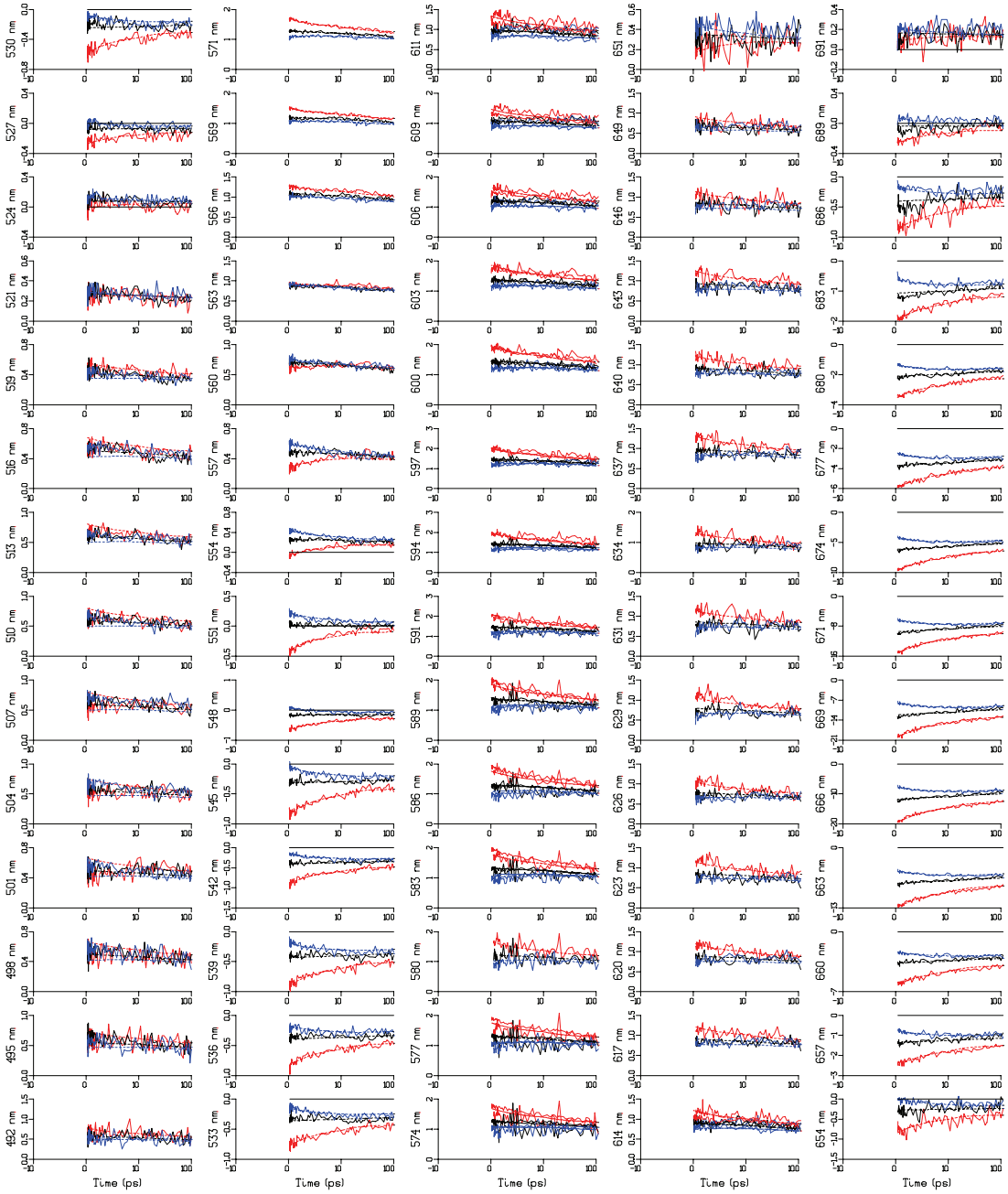

Figure S 11

Selected traces at wavelengths (indicated as ordinate labels, vertical unit is mOD) from polarized pump-probe data after 670 nm excitation. Dashed lines indicate fit. The time axis is linear till 10 ps, and logarithmic thereafter. The black, red, and blue color correspond to, respectively, magic angle, parallel and perpendicular orientation.