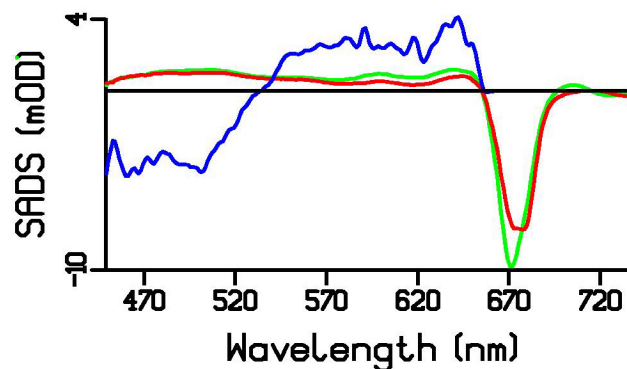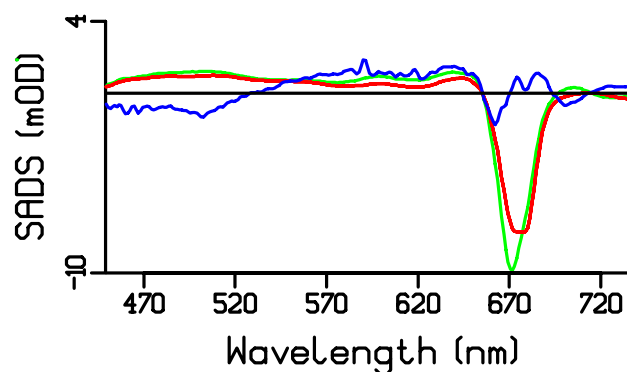Electronic Supporting Information
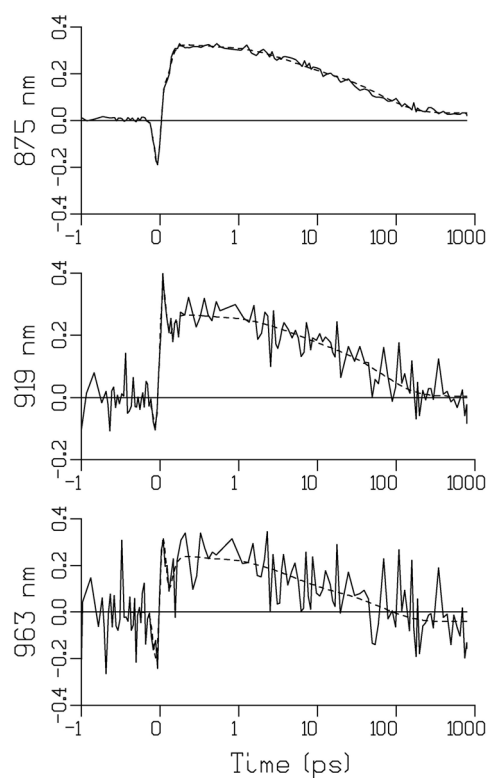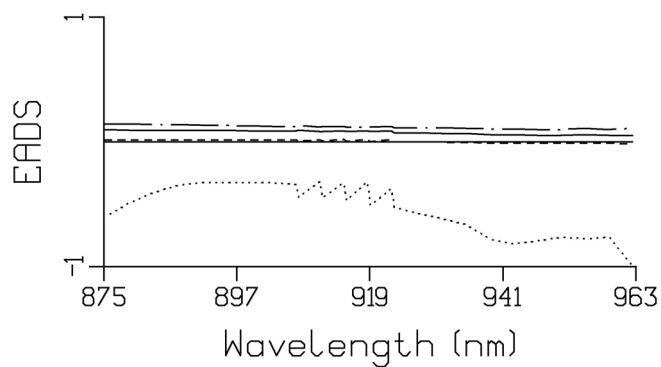

ESI Figure 1. SADS from the target analysis of the time-resolved data obtained from a kHz system upon 678 nm excitation. The kinetic model is depicted in figure 3(*upper panel*) of the text. The difference in the red shift from the Chl 1 compartment to the Chls 2,3 and 4 is due to a slightly bluer excitation wavelength.

k_1	k_2	k_3	k_4	k_5	k_6	k_Q	k_8
0.9	1.0	12.9	9	80	4(f)	100(f)	inf

ESI Table 1. Reciprocal of rate constants (ps^{-1}) from the target analysis of the time-resolved data obtained from a kHz system upon 678 nm excitation; f stands for fixed parameter.

ESI Figure 2. SADS from the target analysis of the time-resolved data obtained from a kHz system upon 678 nm excitation. Here the zero constraint on the Q SADS was released, resulting in erratic amplitudes in the Chl Q_y region. Furthermore, the Q decay rate k_6 was a free parameter, resulting in a Q SADS which is of similar shape below 655 nm but smaller amplitude. The estimated Q lifetime was 16 ps.

ESI Figure 3. (*Upper*) EADS from a global analysis of the time-resolved data in the nIR region. (*Lower*) Selected kinetic traces and corresponding fit from the global analysis. The amplitudes are in mOD.