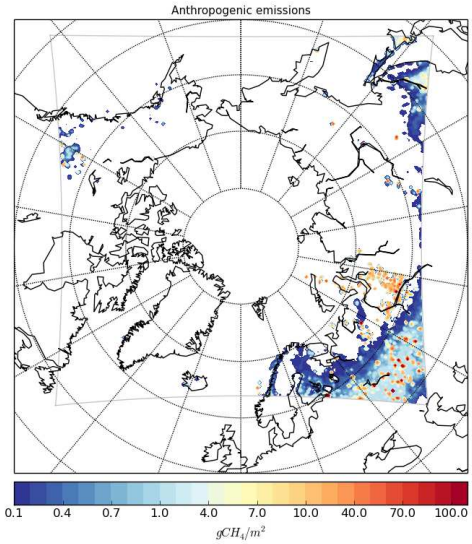

Figure S1. Anthropogenic emissions map. Sum over the year 2012.

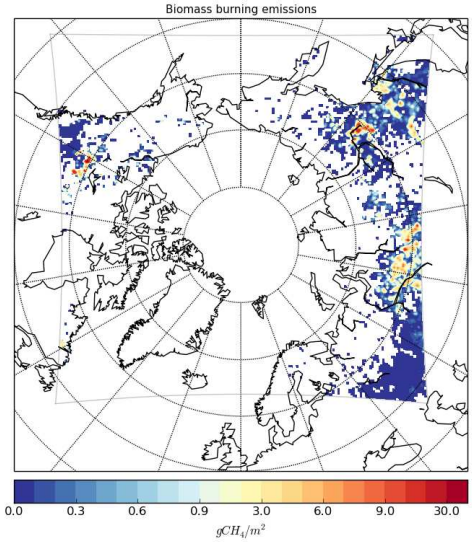

Figure S2. Biomass burning emissions map. Sum over the year 2012.

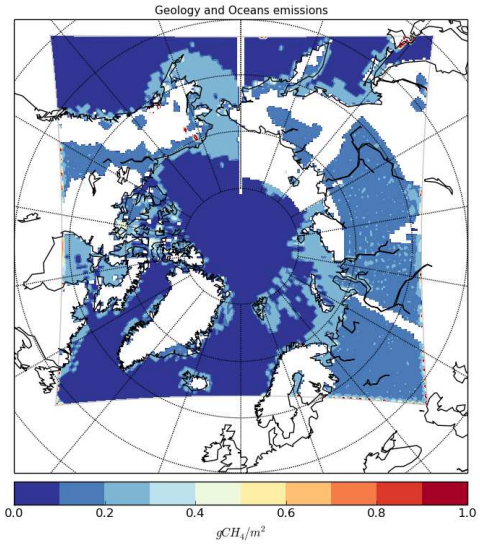

Figure S3. Geology and oceans emissions map. Sum over the year.

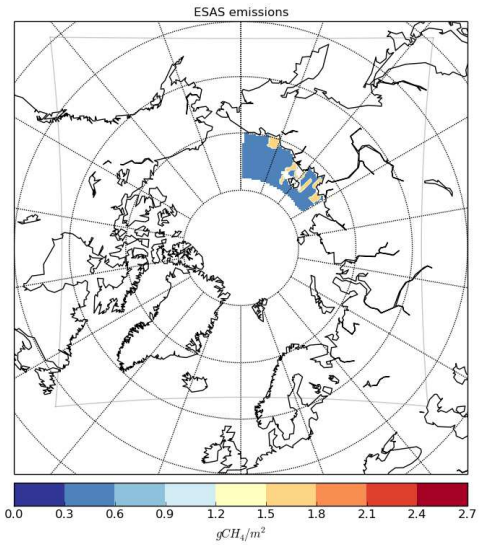

Figure S4. East Siberian Arctic Shelf emissions map. Sum over the year.

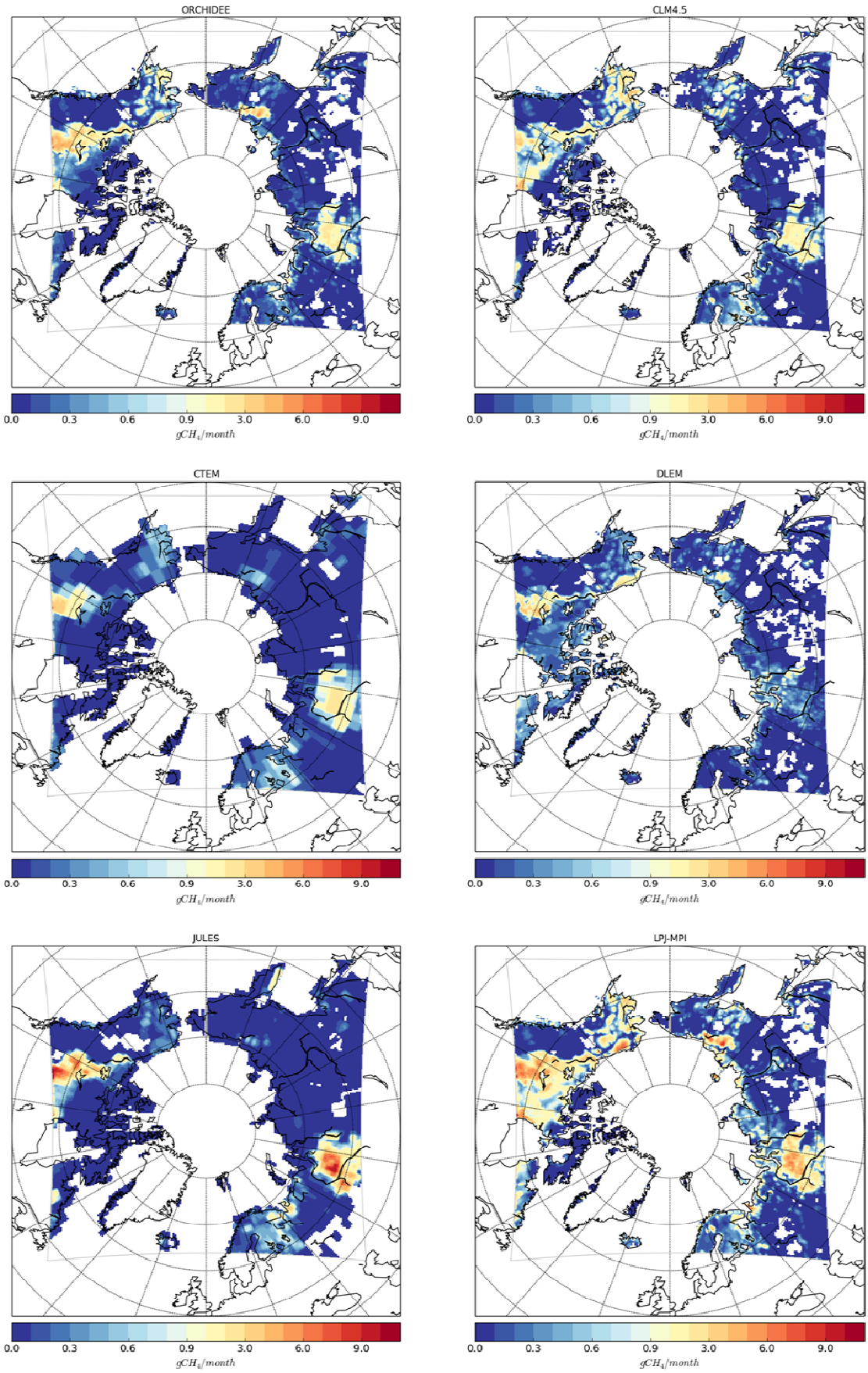

Figure S5. Wetland emission maps from 6 wetland models used in Poulter et al. (submitted). Average over June-October 2012.

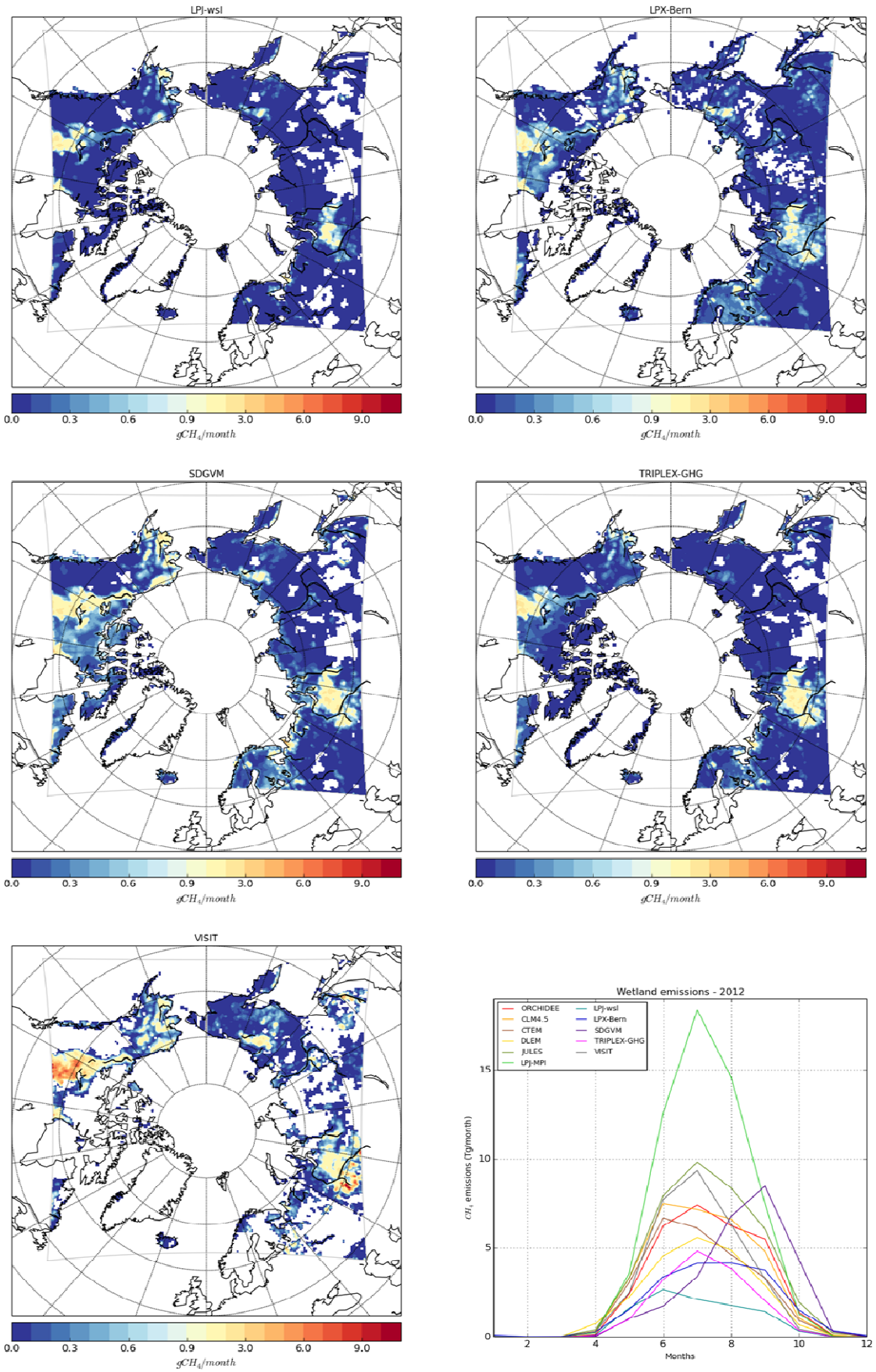

Figure S6. Wetland emission maps from 5 wetland models used in Poulter et al. (submitted). Average over June-October 2012. Also represented is the seasonal cycle of the emissions from the 11 models in the studied domain.

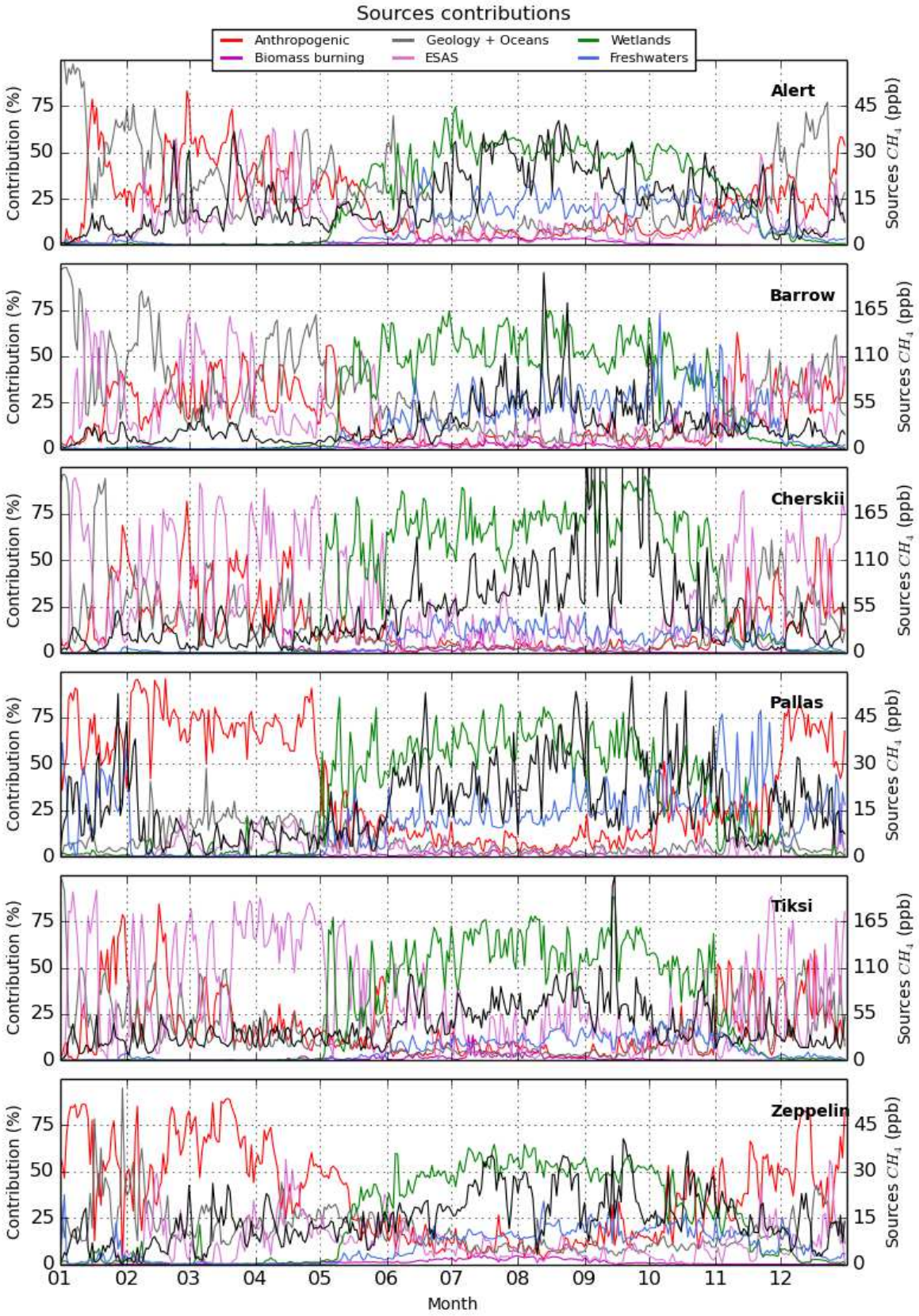

Figure S7. Sources contributions (in %, left-hand axis) to the CH_4 abundance (excluding CH_4 resulting from the boundary conditions) simulated by CHIMERE, at six measurement sites, in 2012. Red: anthropogenic emissions. Magenta: biomass burning. Grey: geology and oceans. Pink: ESAS. Green: wetlands. Blue: freshwaters. The black line represents the CH_4 mixing ratio resulting from all the sources emitted in the domain (in ppb, right-hand axis). Maximum contribution for Cherskii CH_4 exceeds the chosen scale and reaches 1021 ppb.

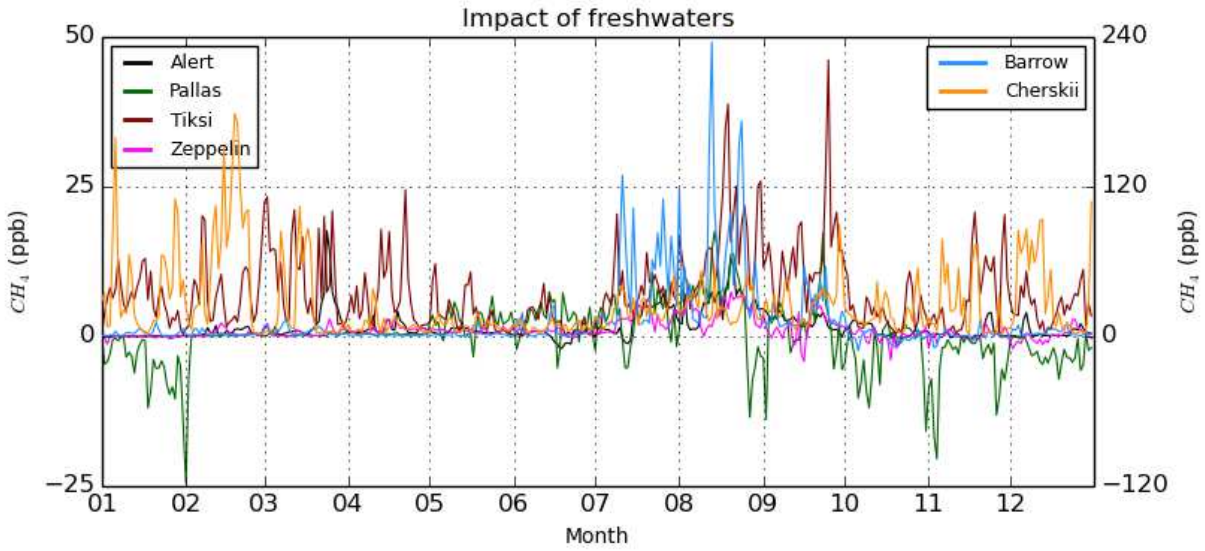

Figure S8. Difference between the simulation using the bLake4Me lake emission inventory and the reference simulation, at six measurement sites, in 2012. Barrow and Cherskii plots refer to the right-hand axis.

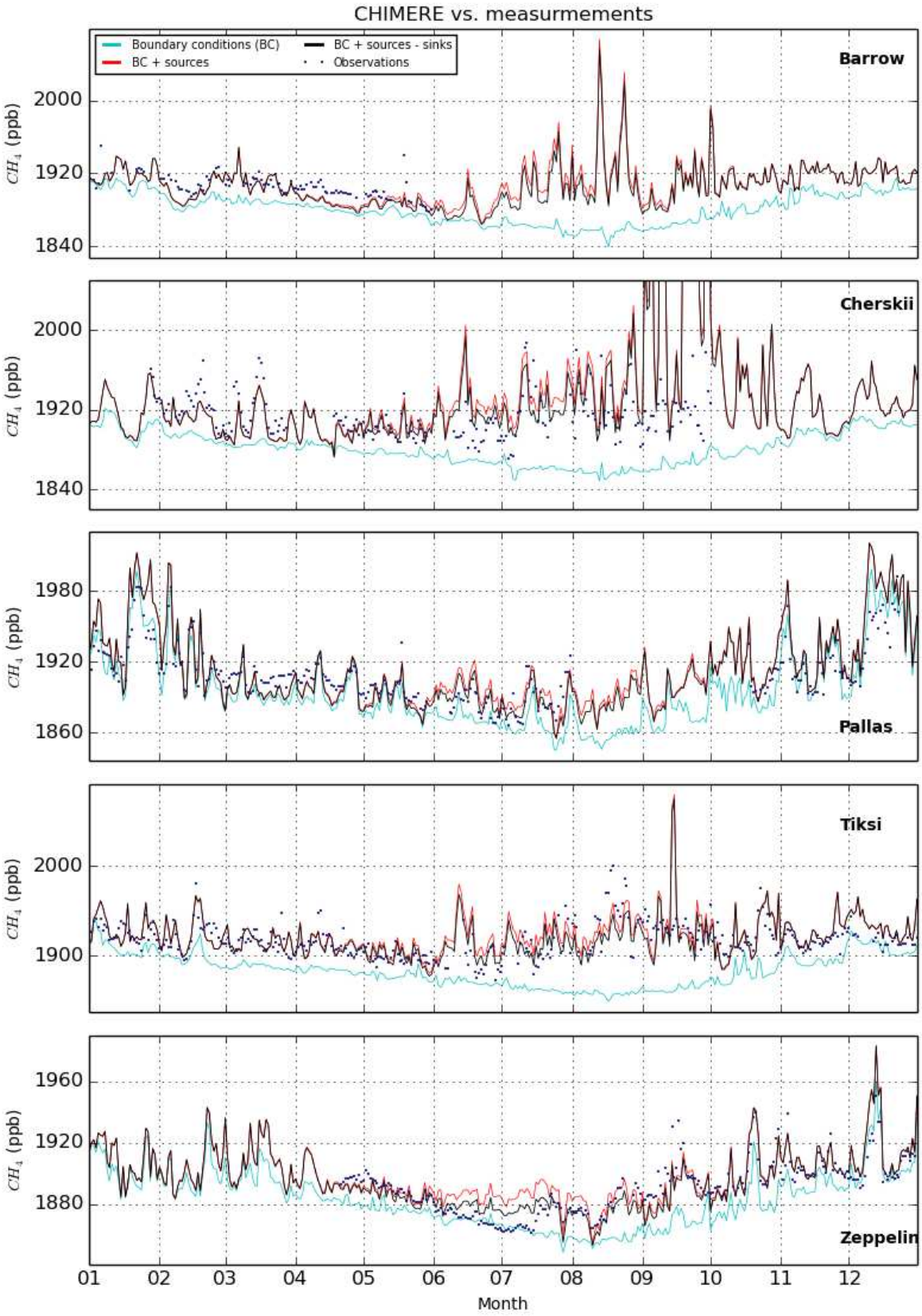

Figure S9. Time series of simulated and observed methane mixing ratios, at Barrow, Cherskii, Pallas, Tiksi and Zeppelin, in 2012. The cyan line represents the contribution of the boundary conditions; the red line represents the added direct contribution of the sources emitting in the domain; the black line includes the three added sinks (OH, soil, Cl). The blue points represent the observations. Time resolution for simulations and observations is 1 day.