Supplementary Material:

Assessment of the theoretical limit in instrumental detectability of Arctic methane sources using ^{13}C atmospheric signal

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Figures S1-S23. Time series of $\delta^{13}C\text{-}CH_4$ contribution of each source (in ‰), simulated by CHIMERE, at all sites (but ZEP, see Figure 4 in main article) in 2012. The coloured shades represent the range of $\delta^{13}C\text{-}CH_4$ values when varying isotopic signatures. (Note the different scales.)

Figures S24-S46. Number of days in 2012 when simulated daily direct contributions of Arctic sources to the $\delta^{13}C\text{-}CH_4$ value are above given thresholds, at all sites (but ZEP, see Figure 5 in main article). The coloured shades indicate the dominant Arctic source in terms of $\delta^{13}C\text{-}CH_4$ contribution. The plain and dashed black lines represent the total number of days but using various wetland signatures (from the heavier to the lighter scenario). (Note the non-linear scale for the x-axis.)

Figure S1. Time series of δ^{13}C-CH_4 contribution of each source (in ‰), simulated by CHIMERE, in Alert (ALT) in 2012. The coloured shades represent the range of δ^{13}C-CH_4 values when varying isotopic signatures. (Note the different scales.)

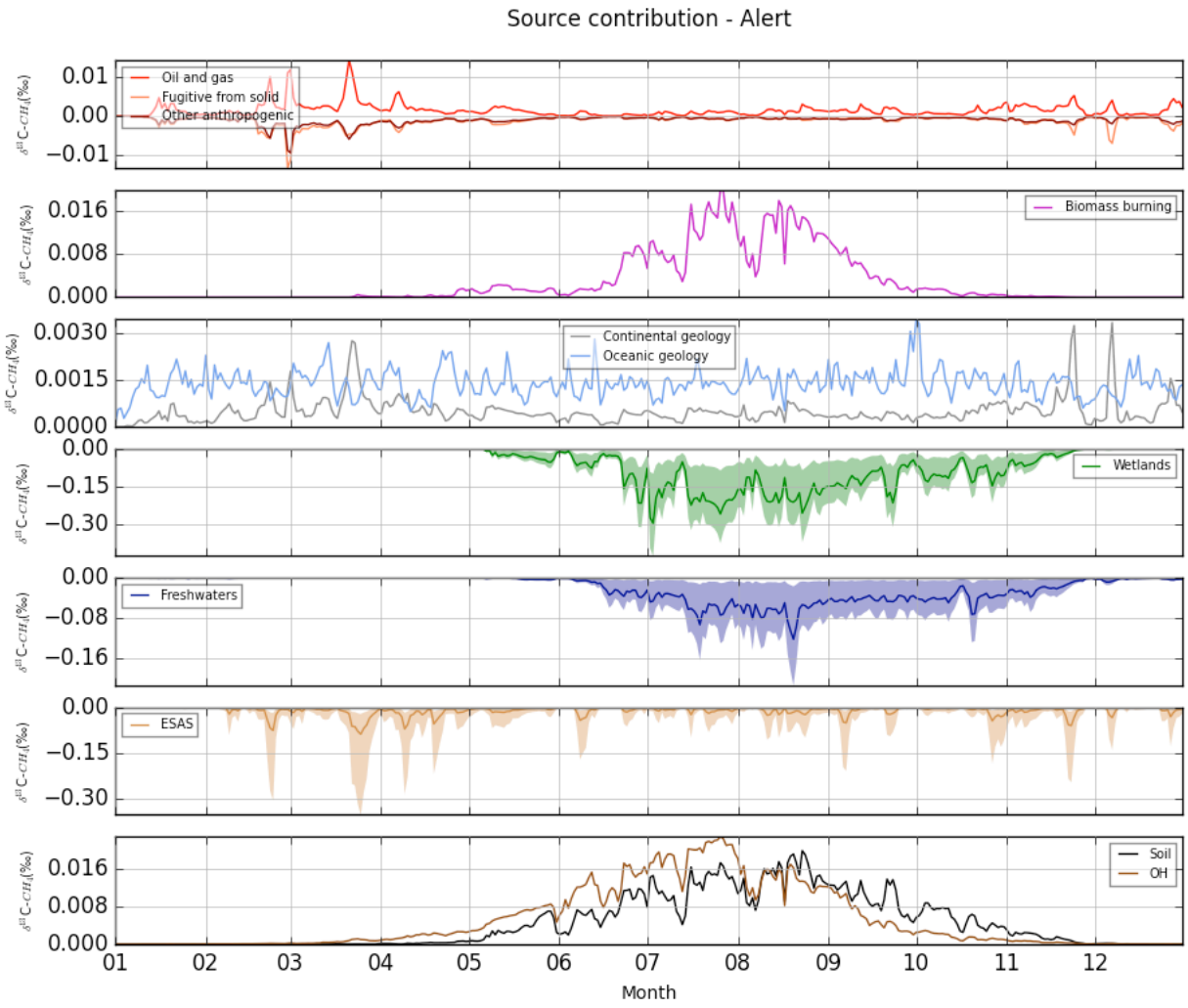

Figure S2. Same as S1 for Ambarchik site (AMB).

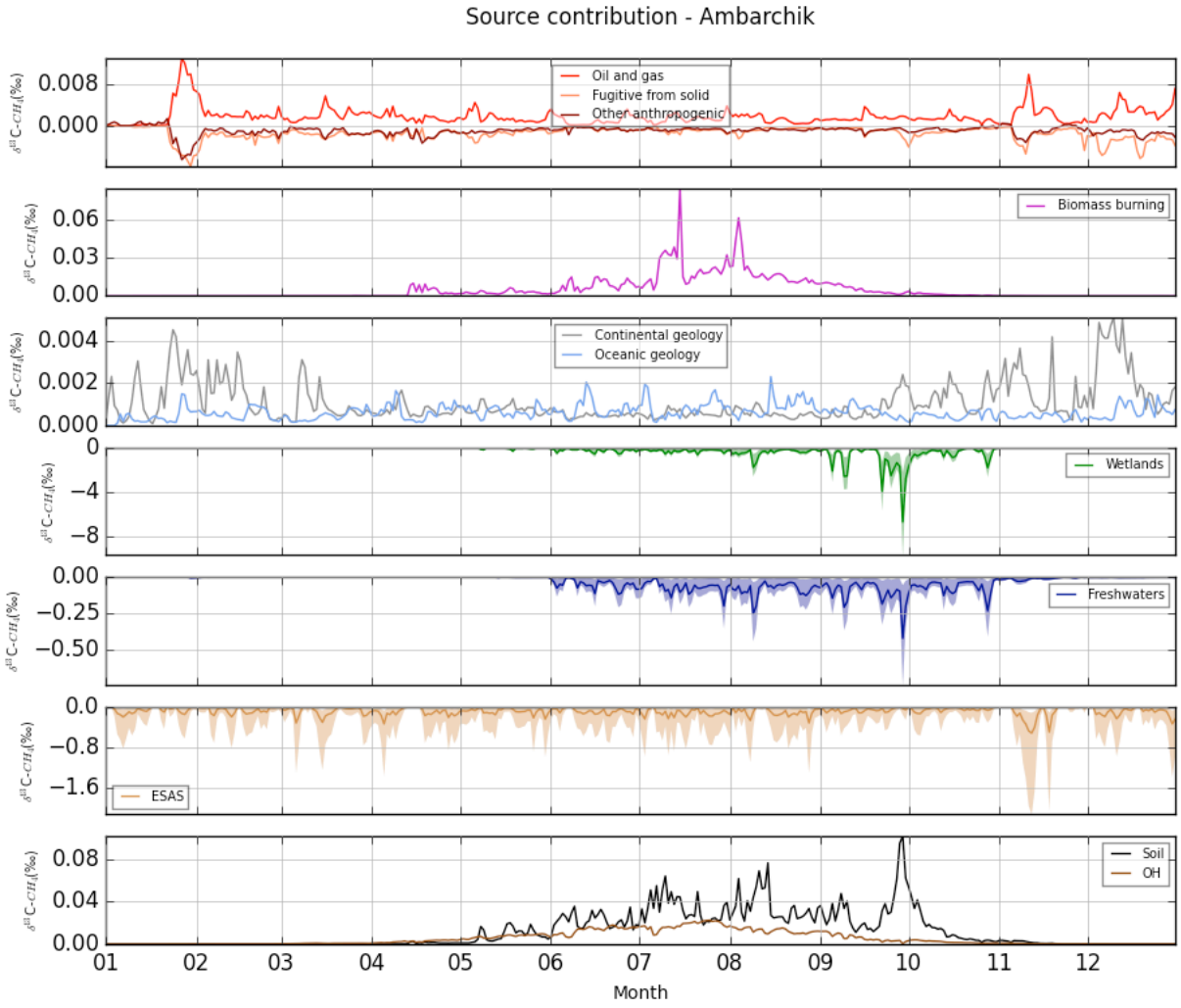

Figure S3. Same as S1 for Baker Lake site (BKL).

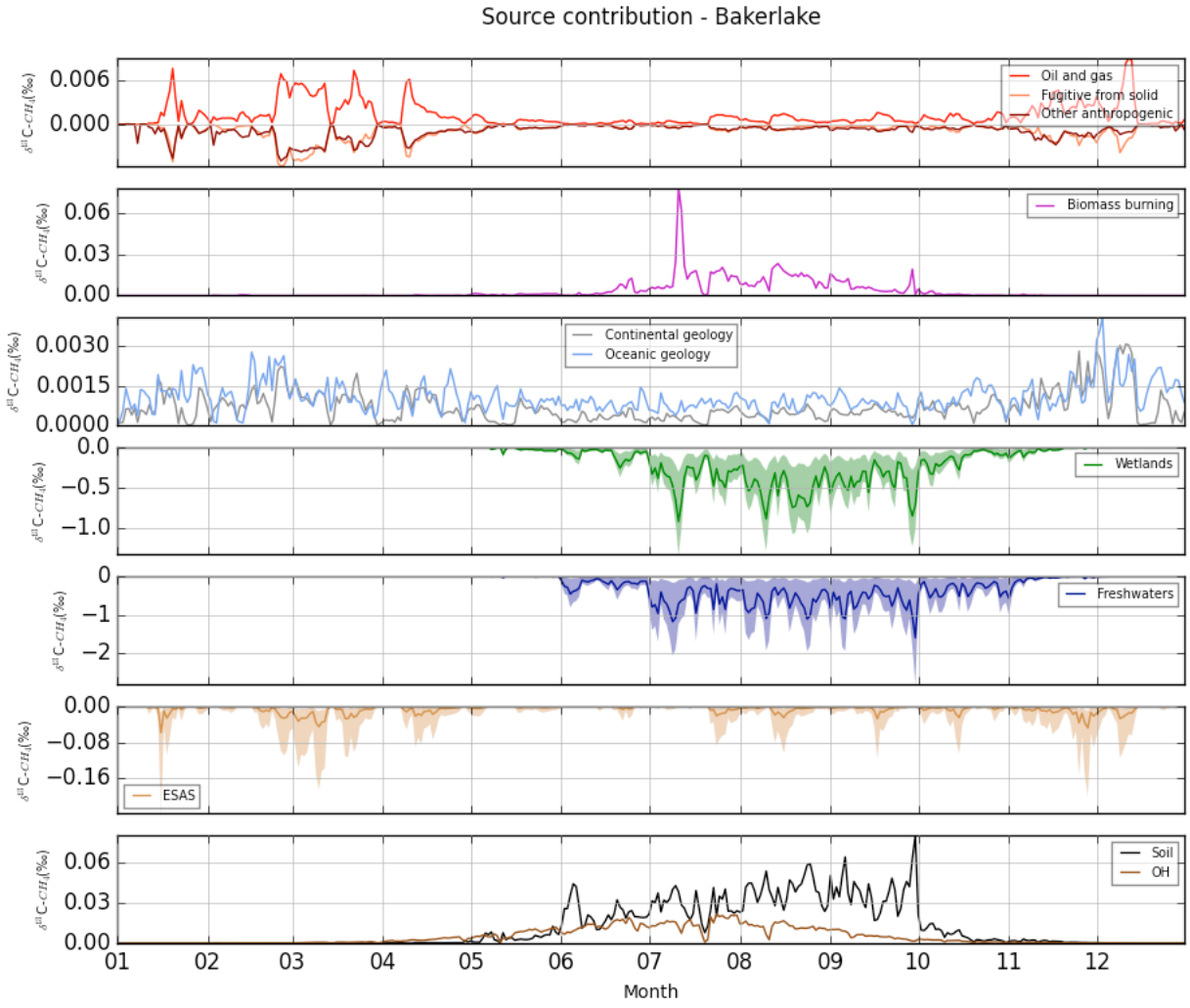

Figure S4. Same as S1 for Barrow site (BRW).

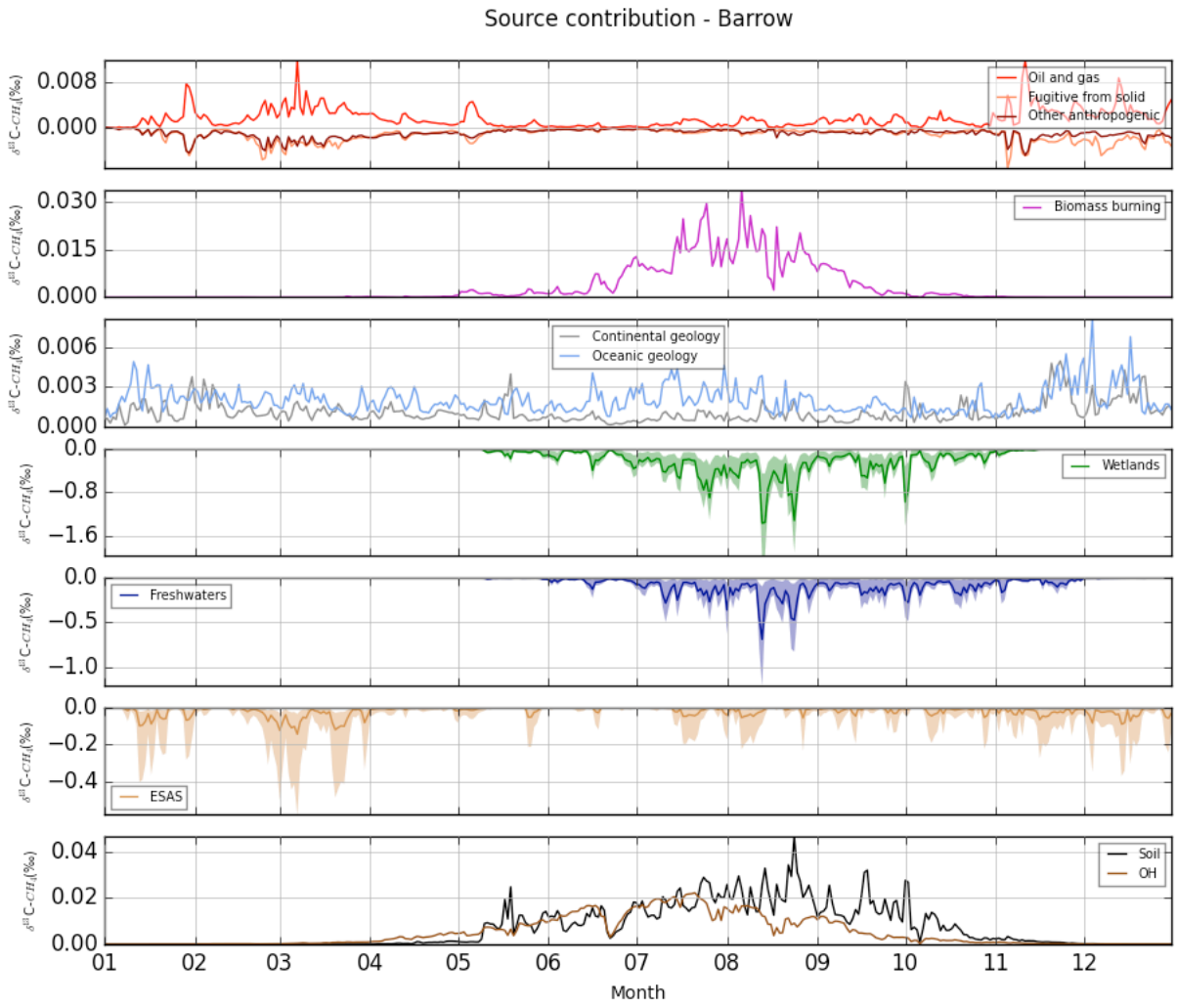

Figure S5. Same as S1 for Behchoko site (BCK).

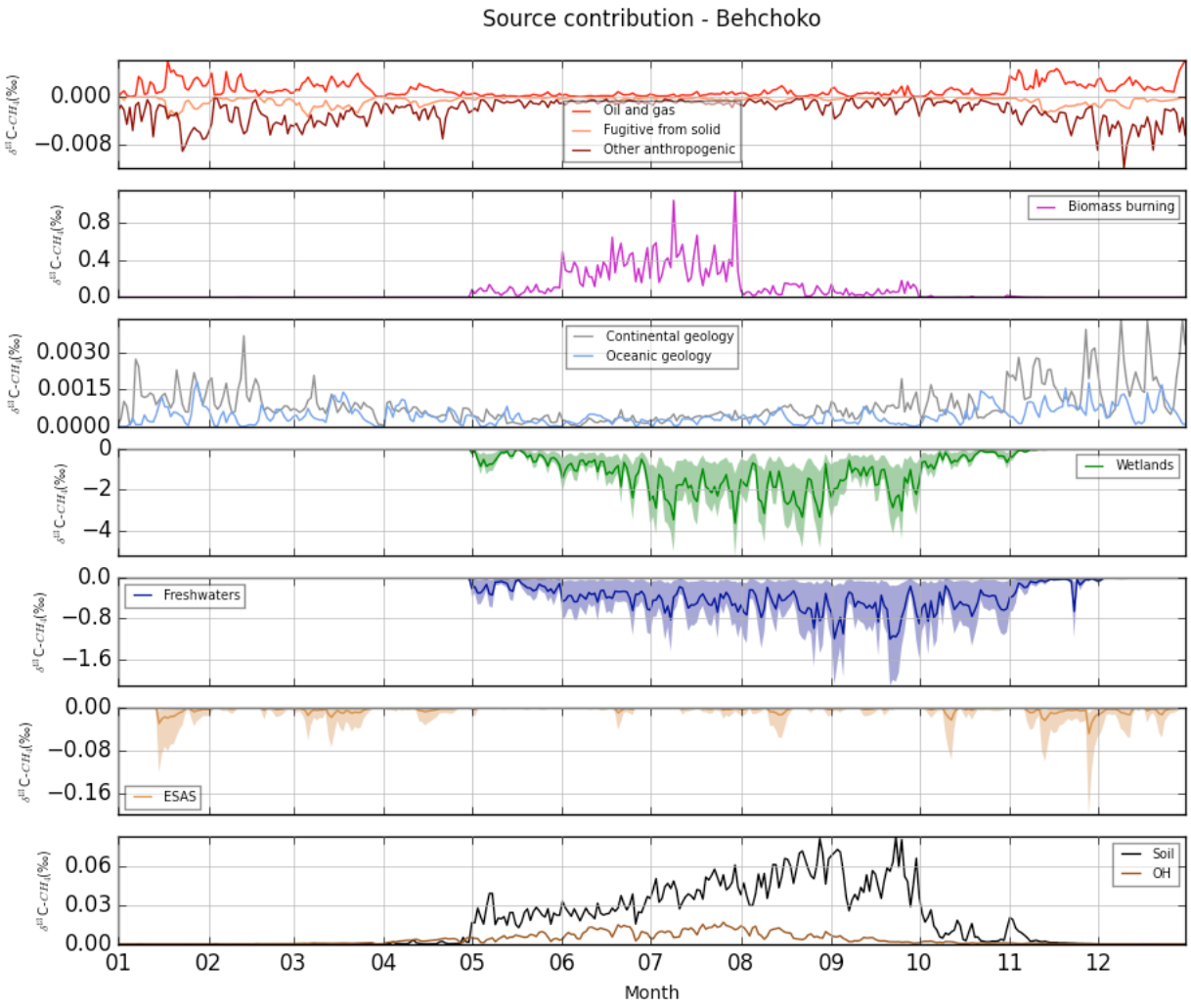

Figure S6. Same as S1 for Cambridge Bay site (CBB).

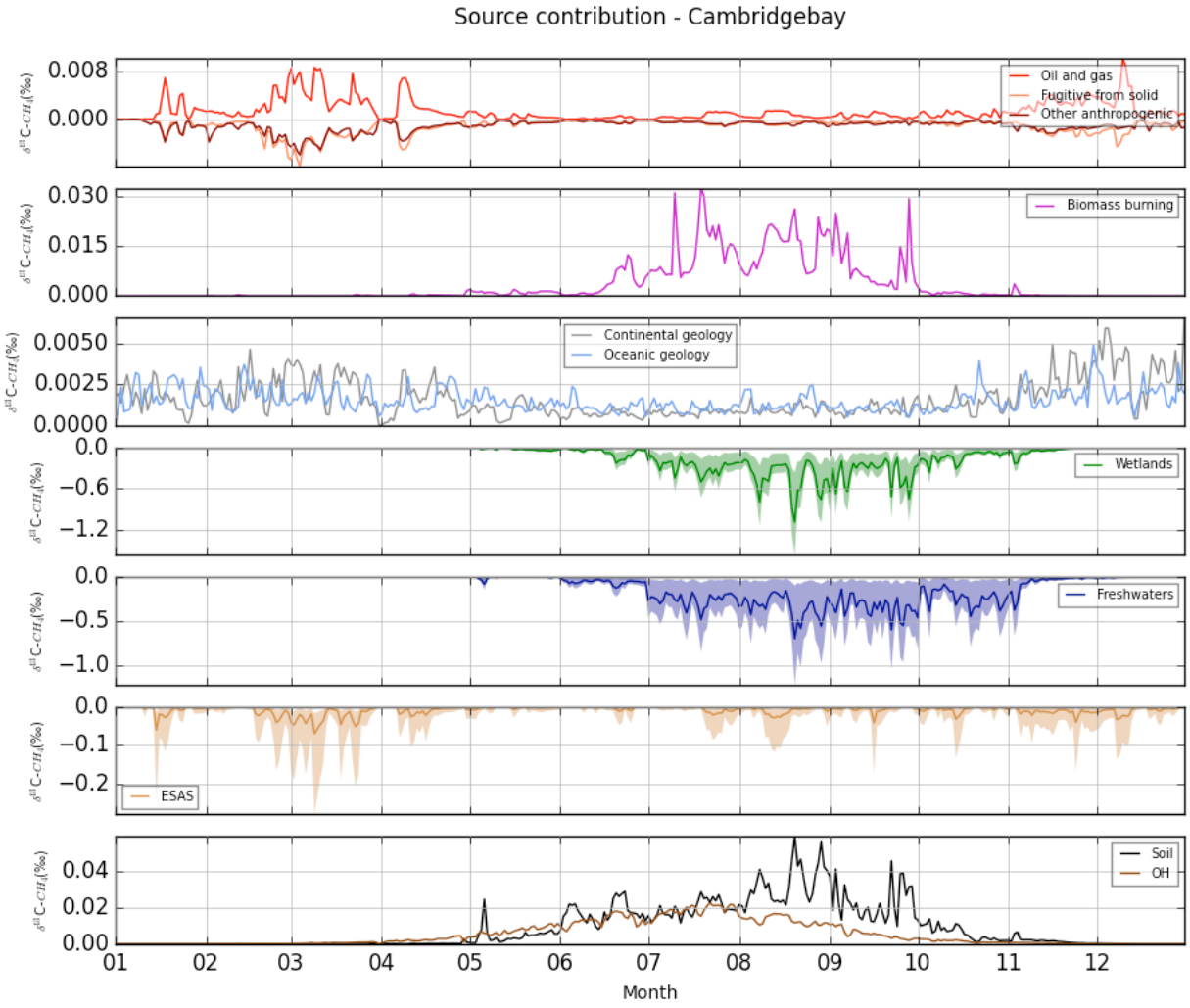

Figure S7. Same as S1 for CARVE Tower site (CAR).

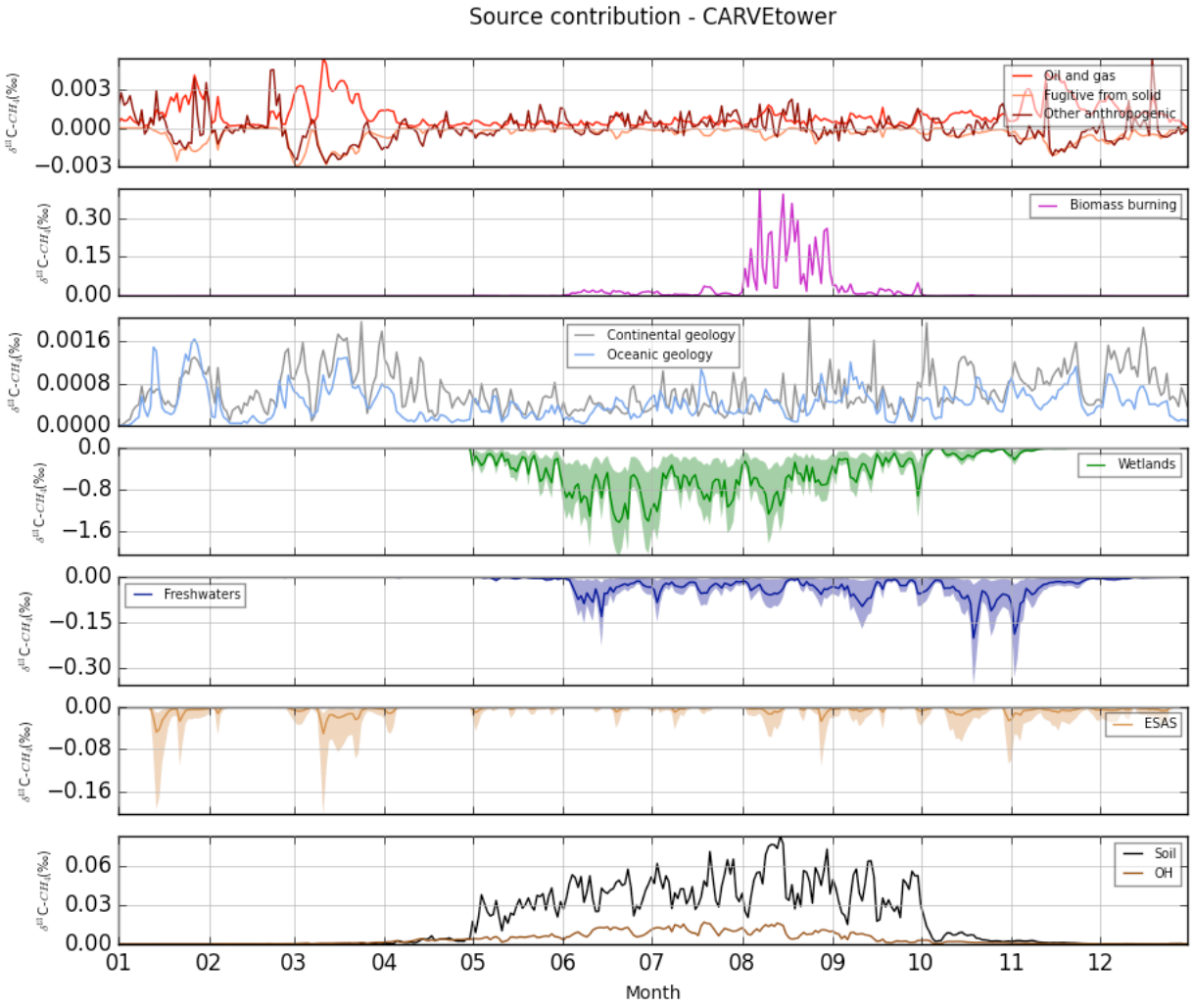

Figure S8. Same as S1 for Cherskii site (CHS).

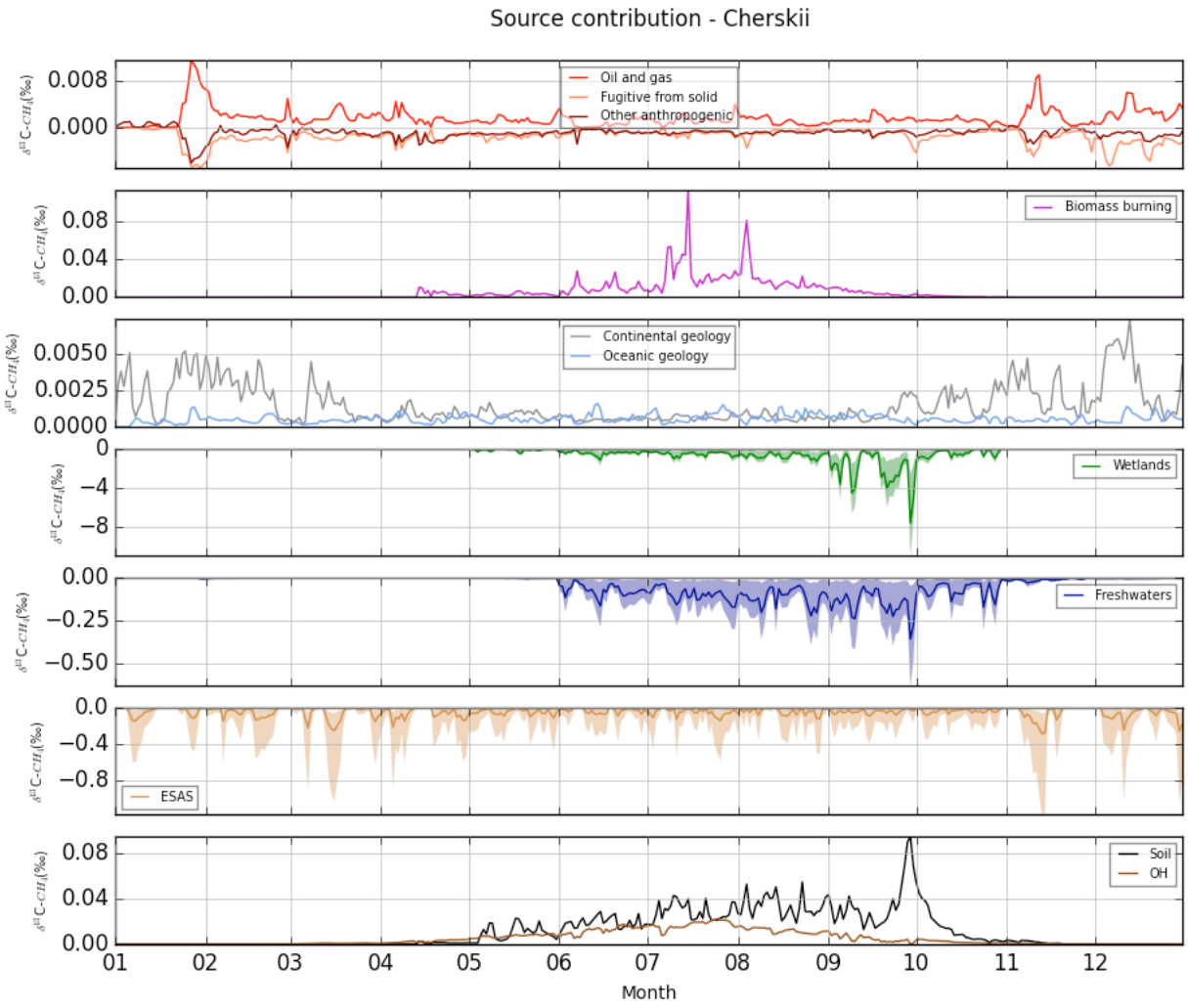

Figure S9. Same as S1 for Churchill site (CHL).

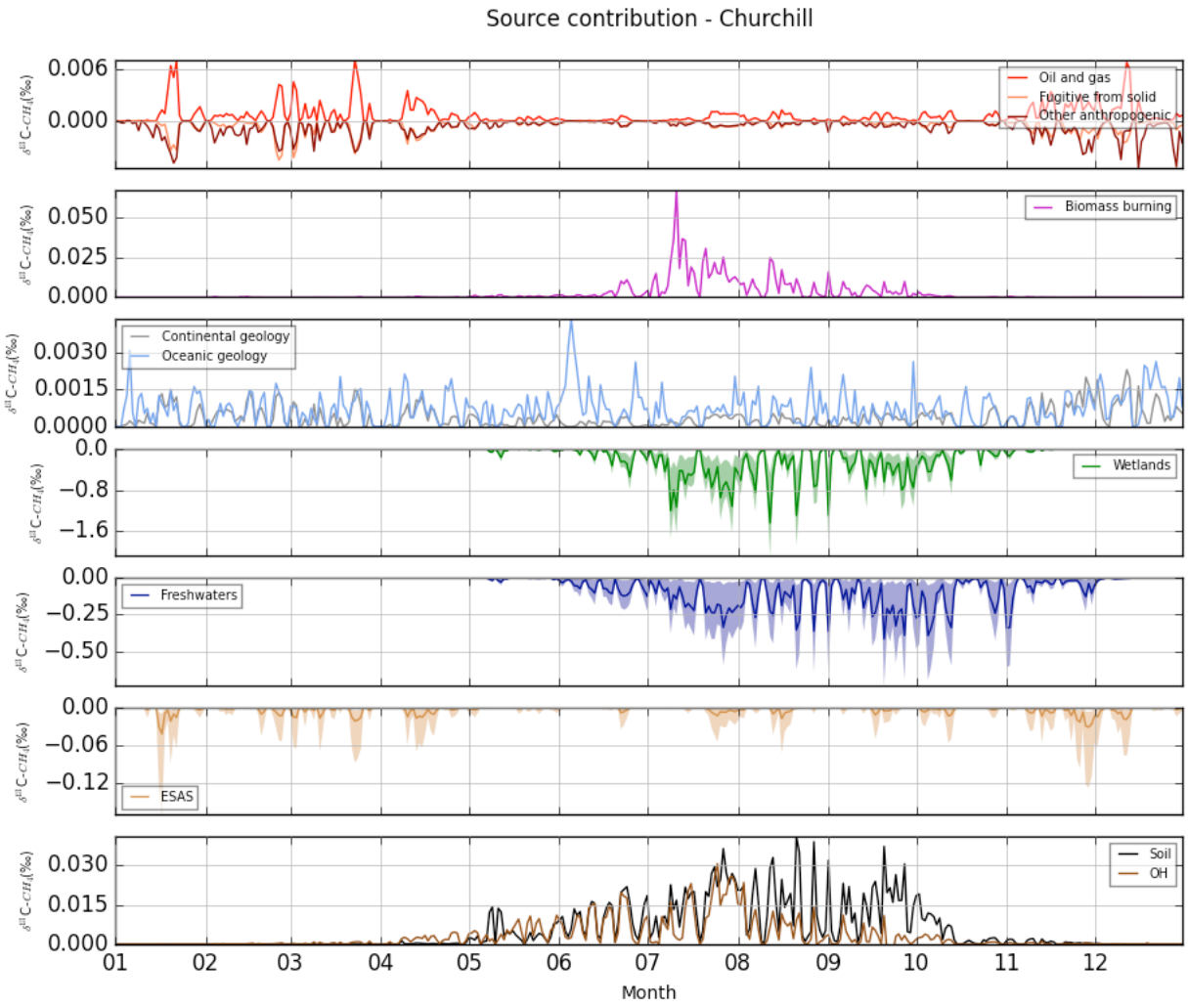

Figure S10. Same as S1 for Coldbay site (CBA).

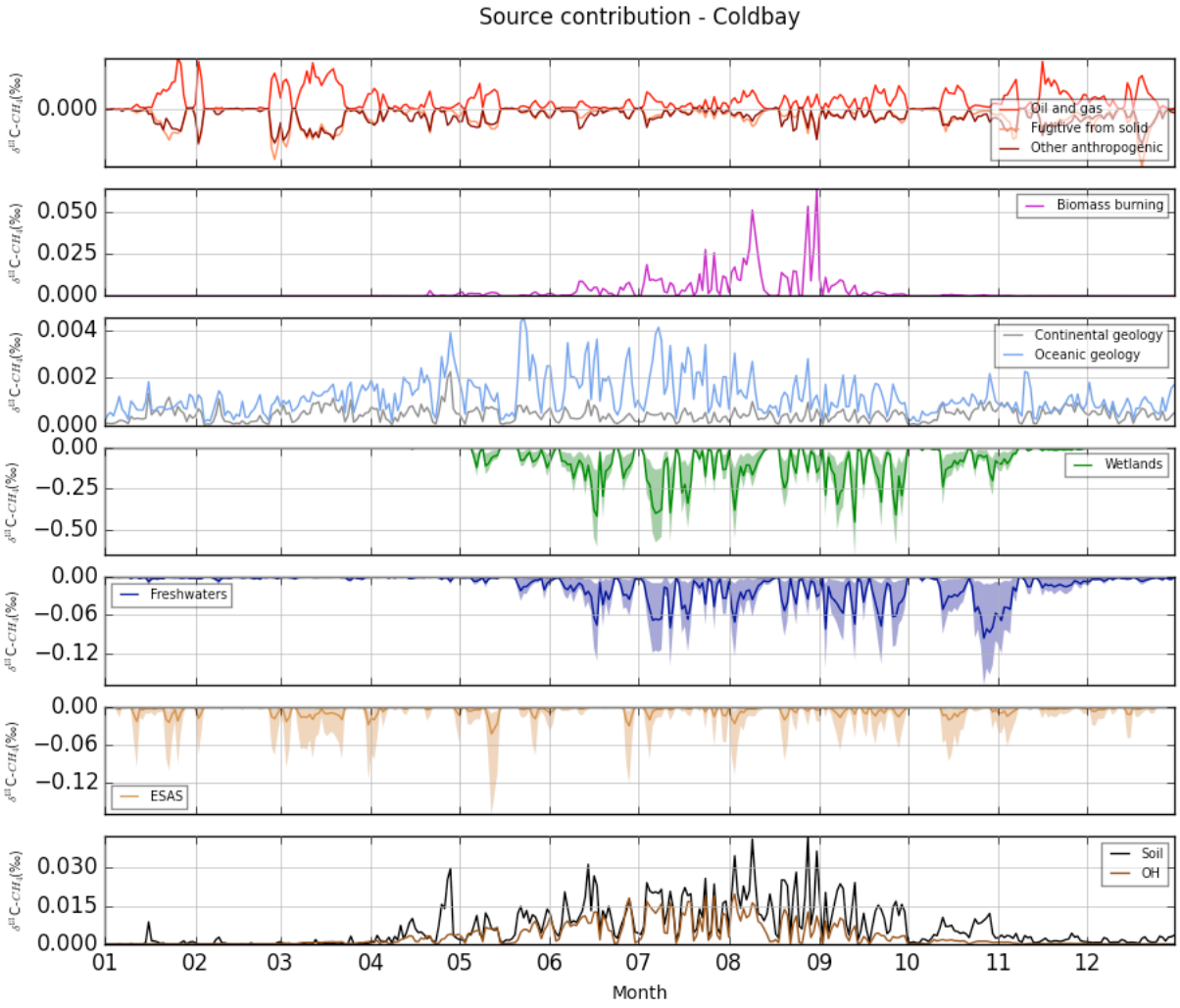

Figure S11. Same as S1 for Demyanskoe site (DEM).

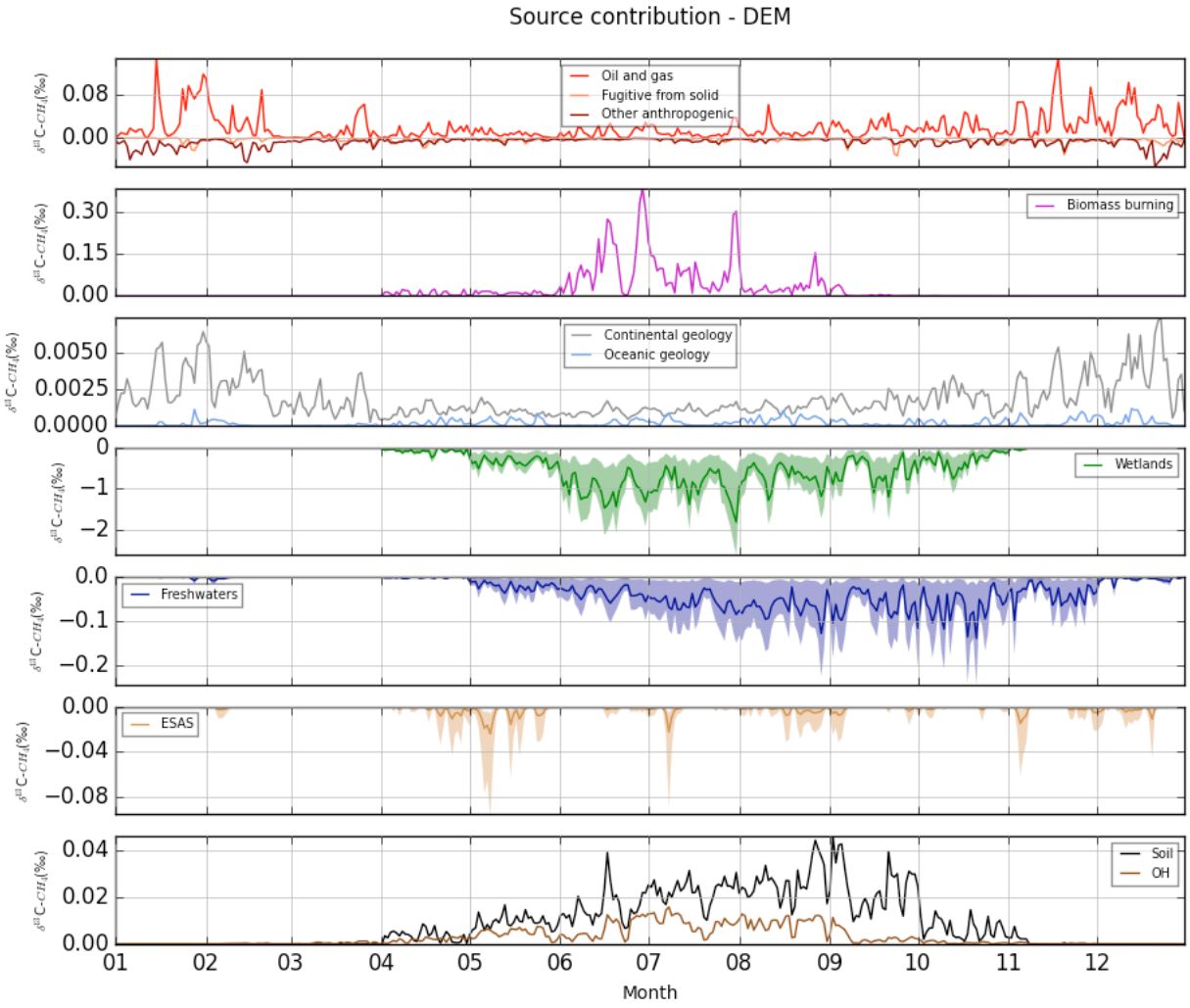

Figure S12. Same as S1 for Igrim site (IGR).

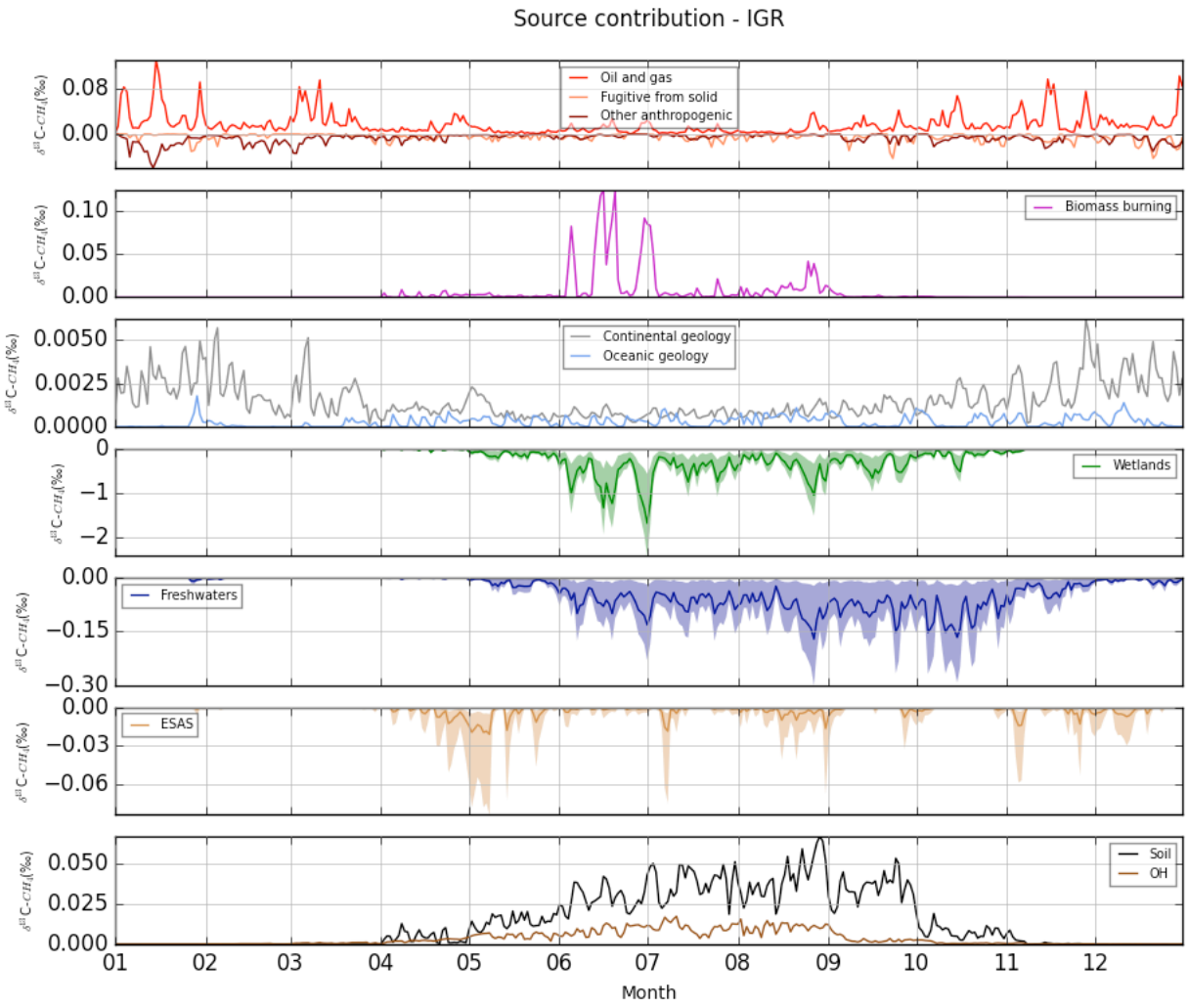

Figure S13. Same as S1 for Inuvik site (INU).

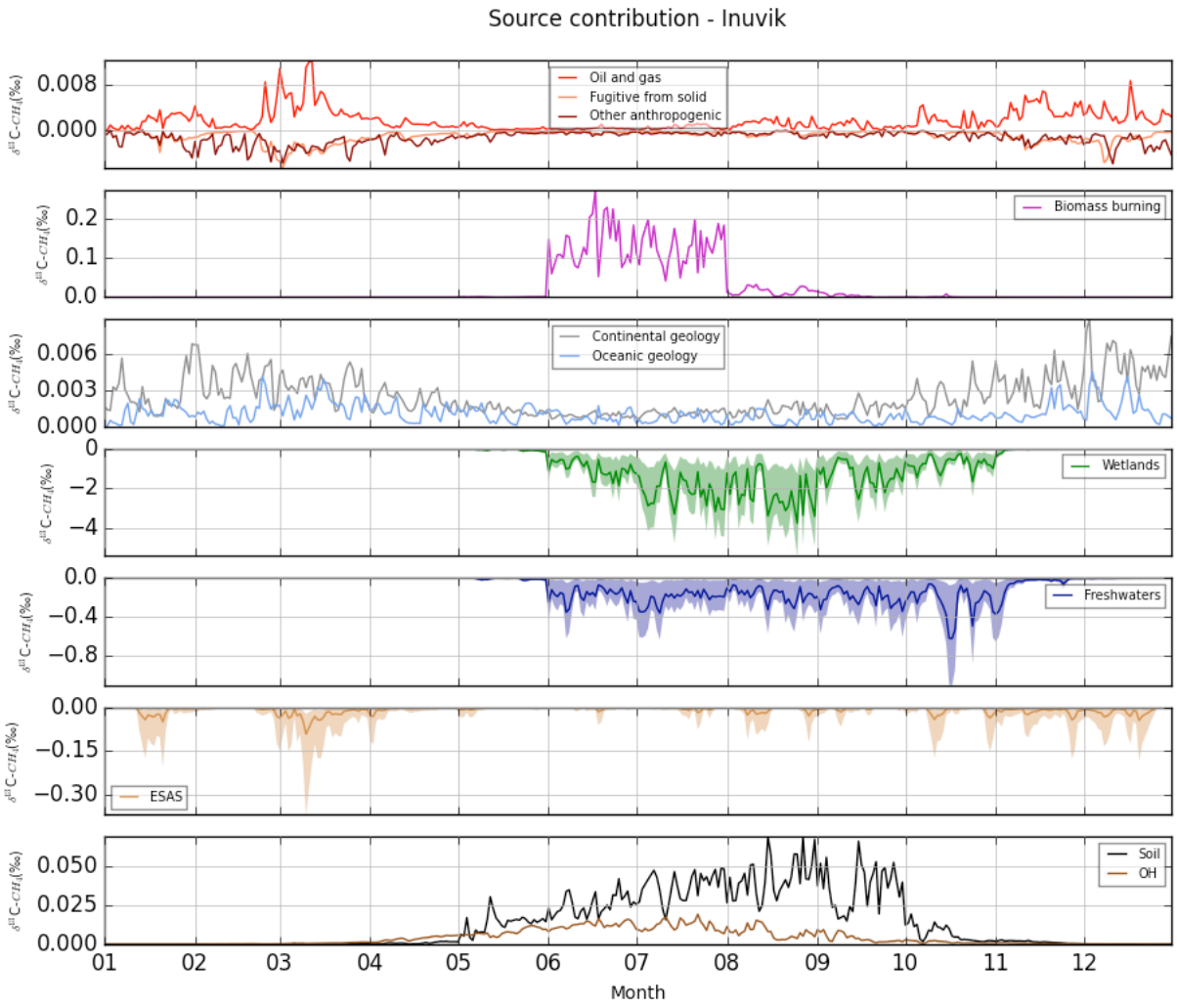

Figure S14. Same as S1 for Karasevoe site (KRS).

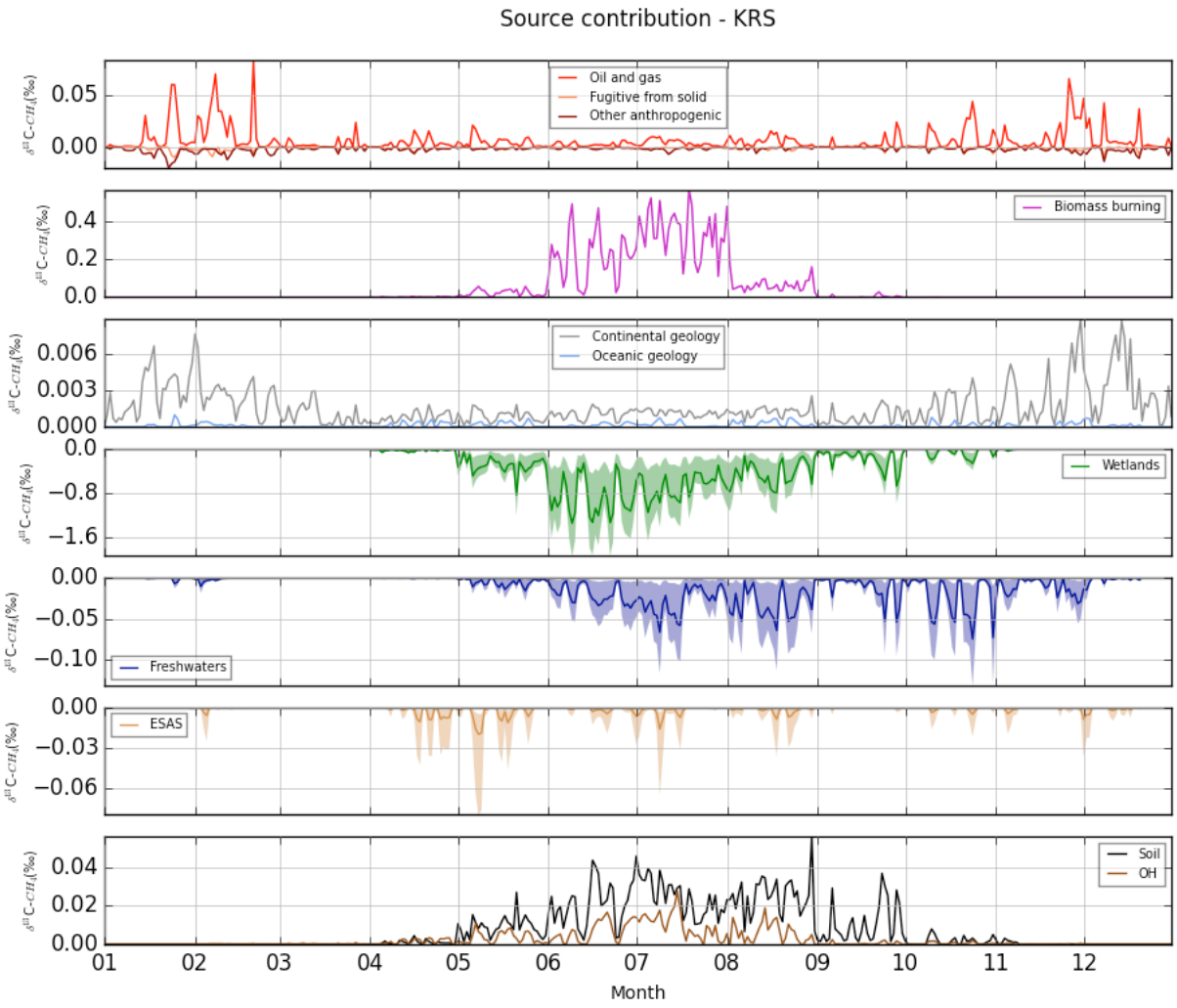

Figure S15. Same as S1 for Noyarbrsk site (NOY).

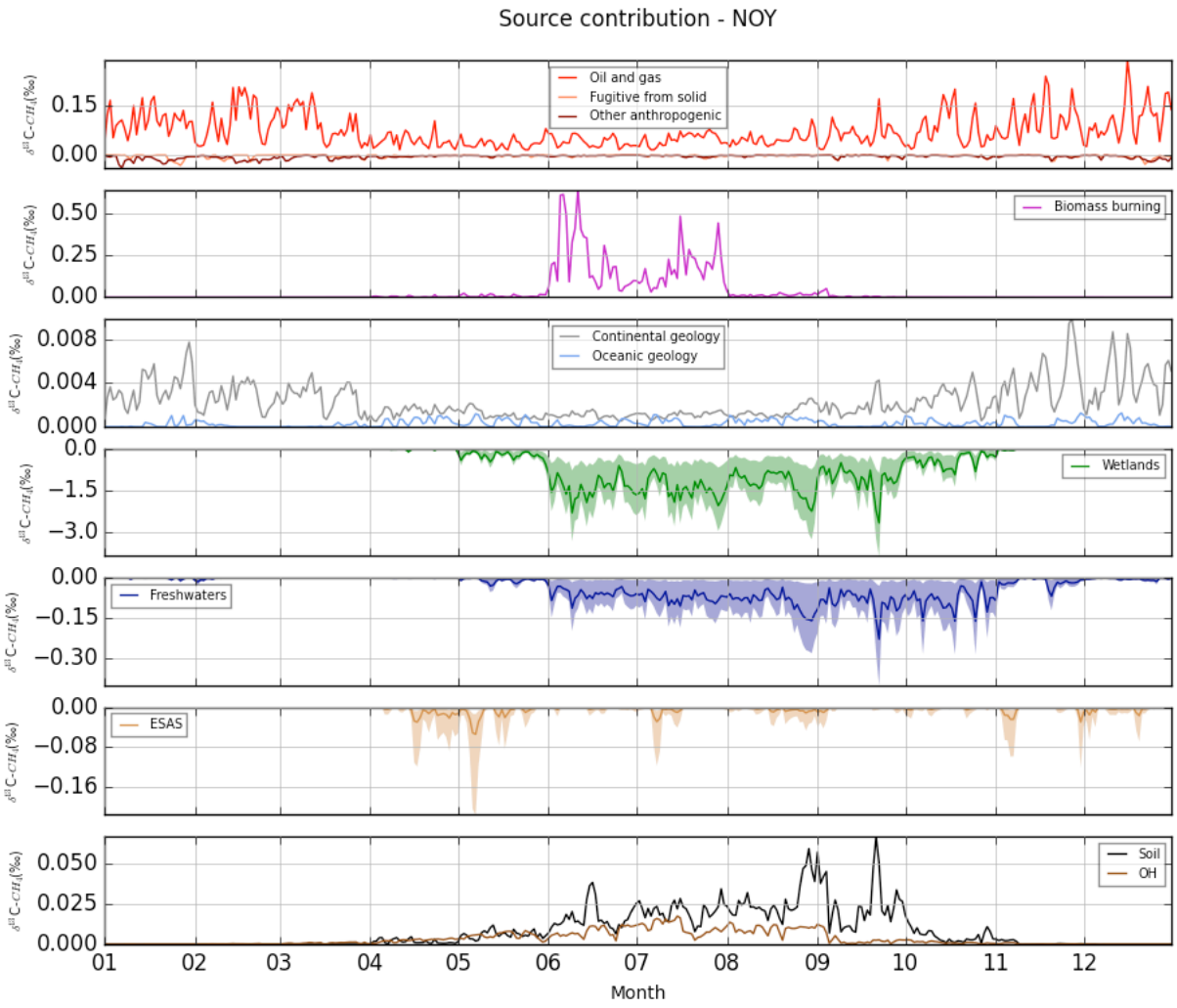

Figure S16. Same as S1 for Pallas site (PAL).

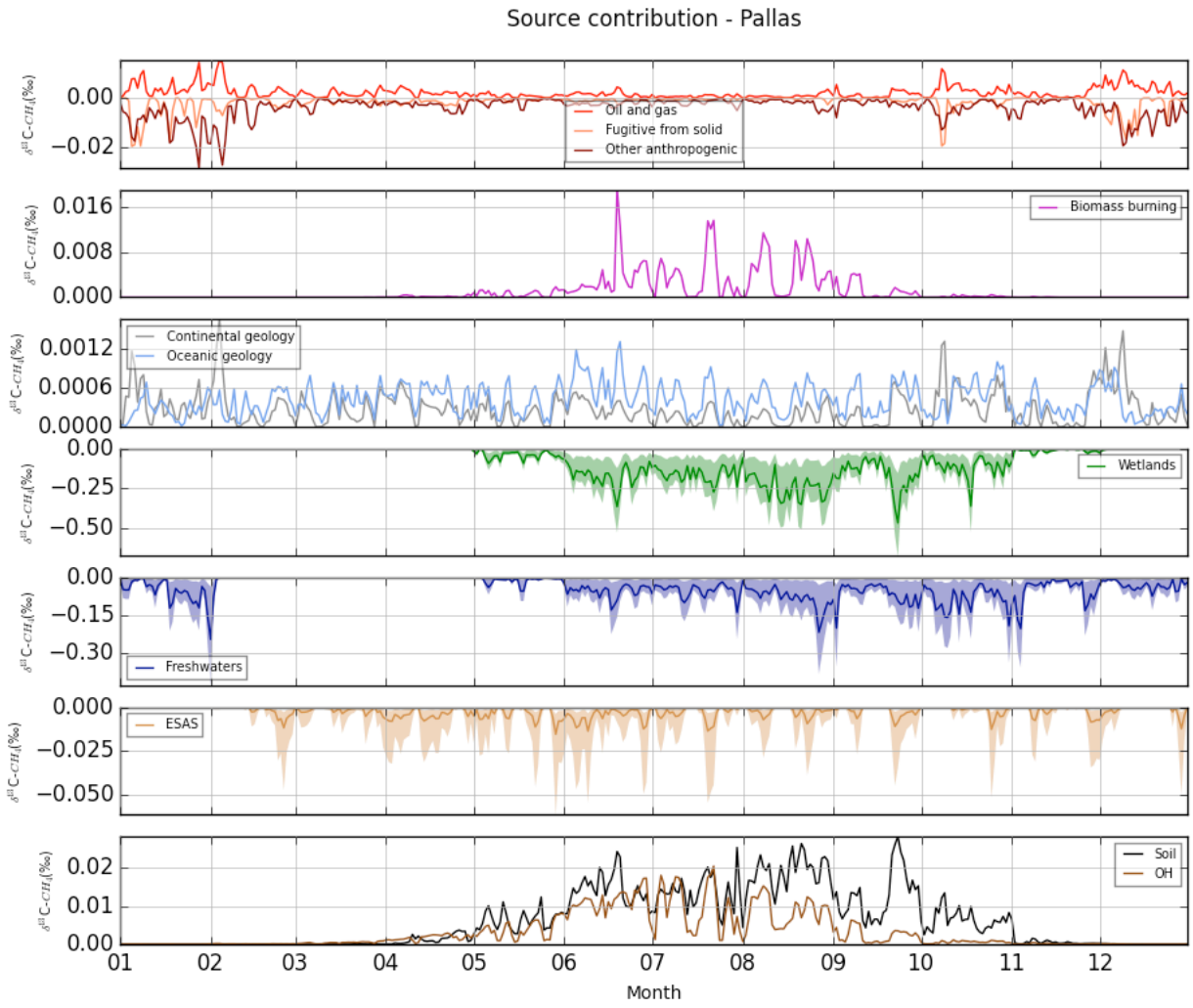

Figure S17. Same as S1 for Storhfoldi site (ICE).

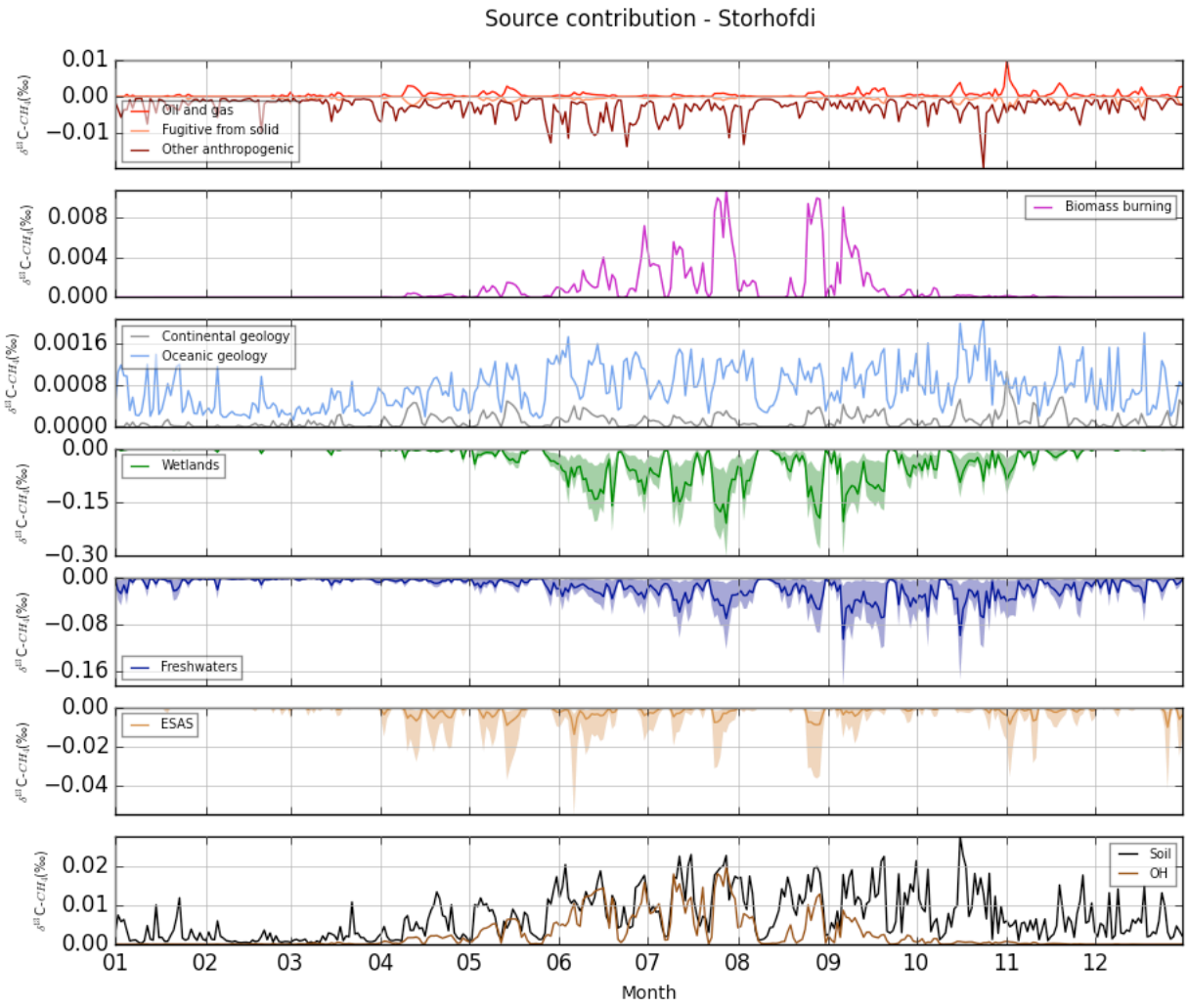

Figure S18. Same as S1 for Summit site (SUM).

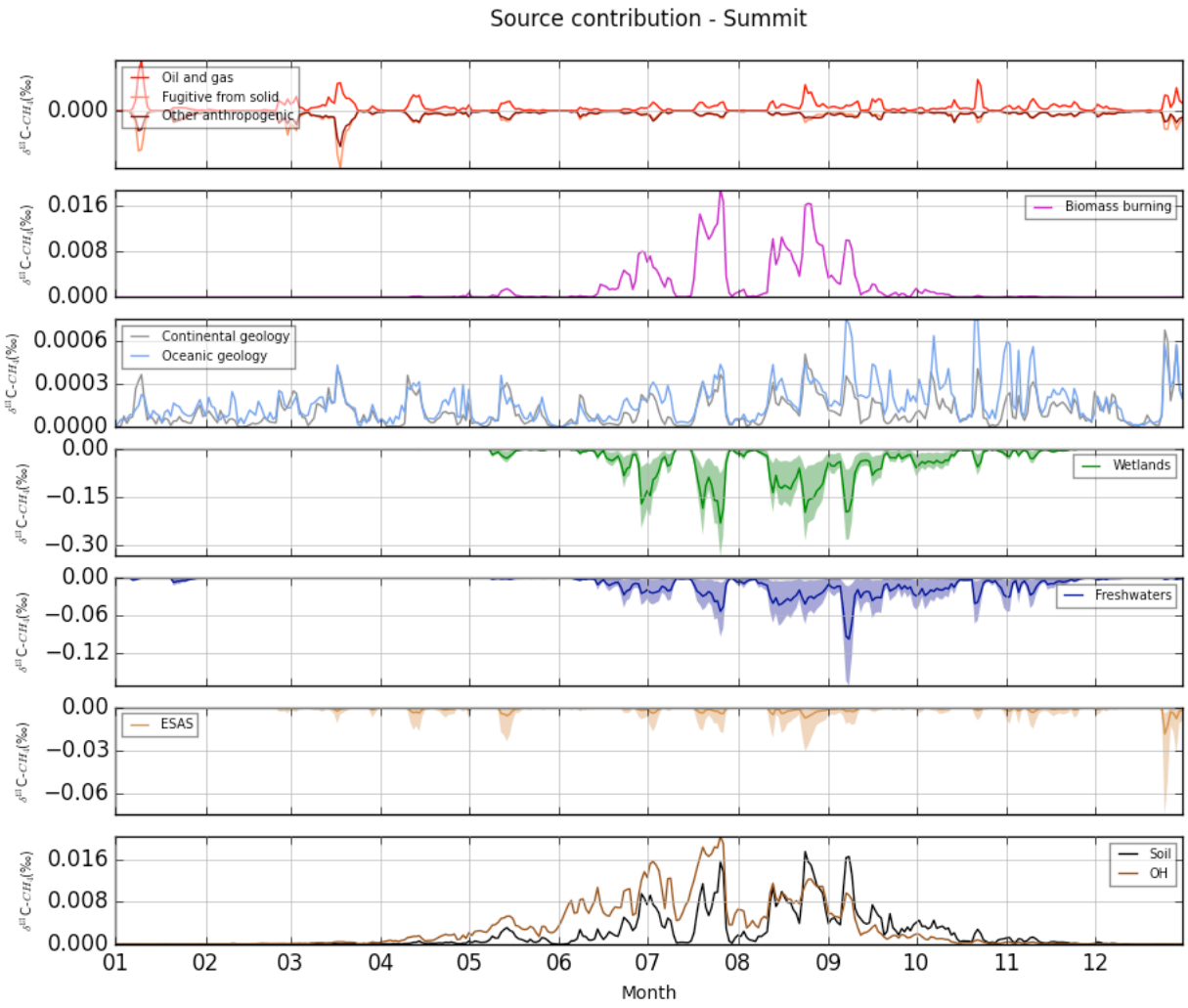

Figure S19. Same as S1 for Teriberka site (TER).

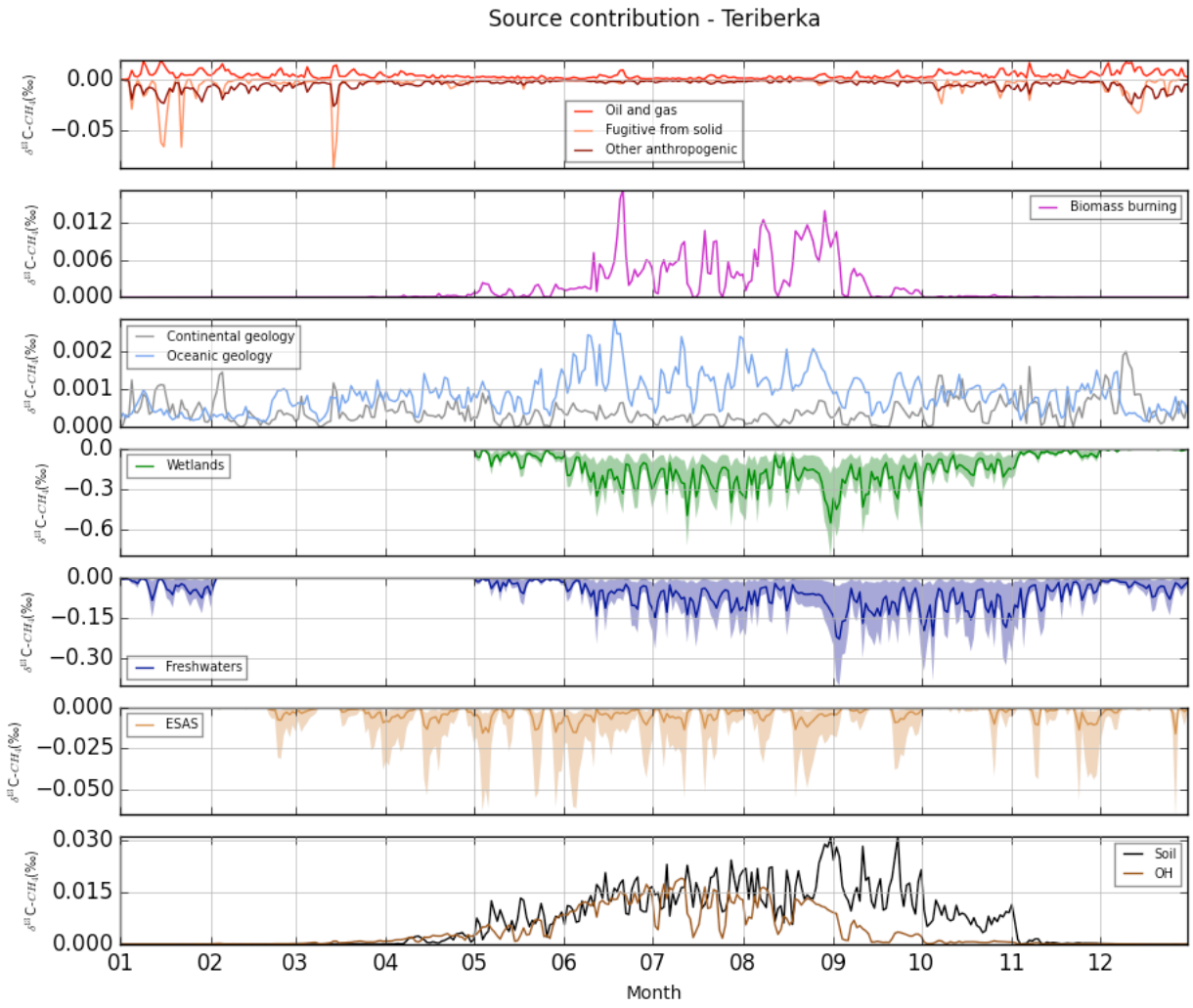

Figure S20. Same as S1 for Tiksi site (TIK).

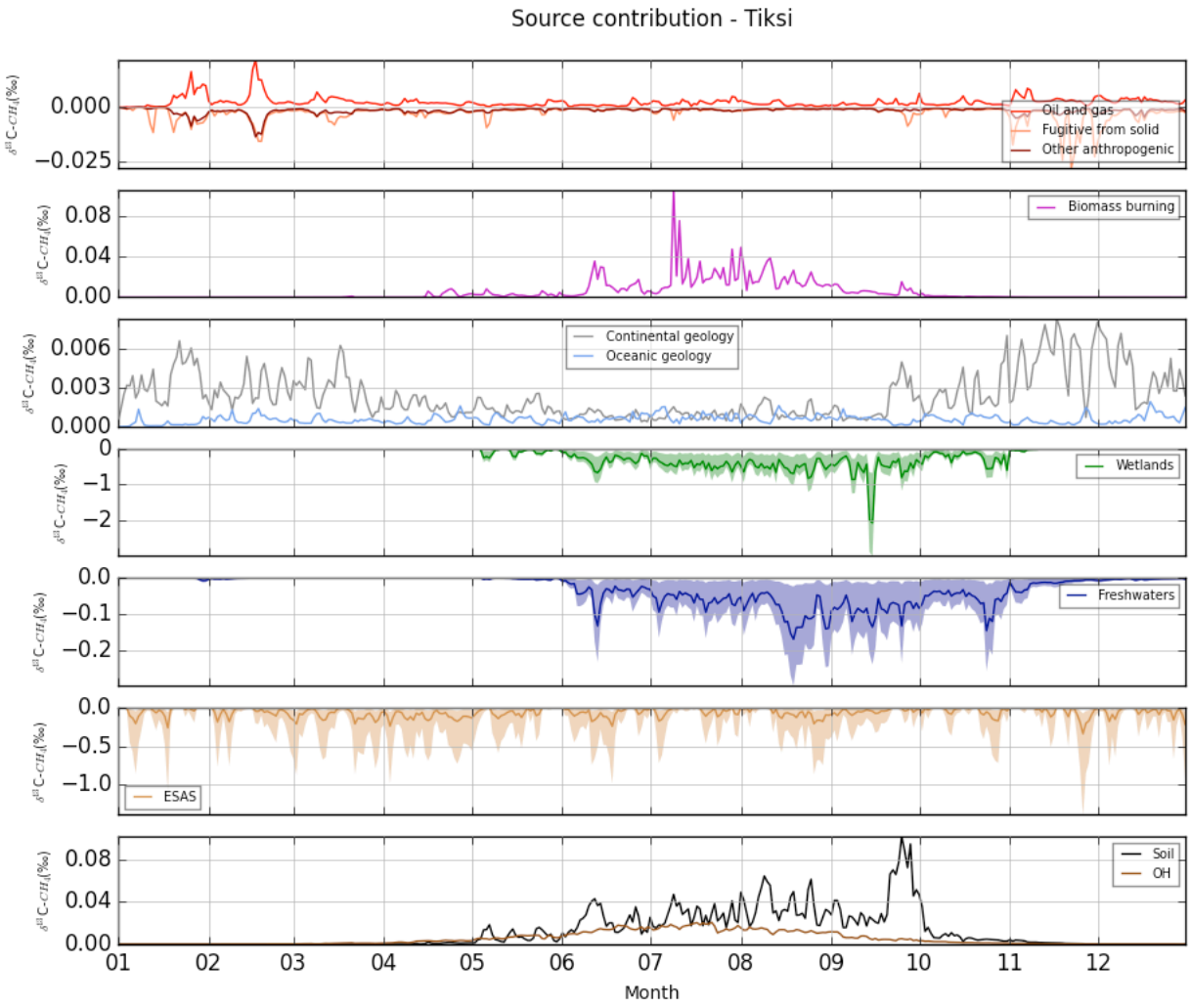

Figure S21. Same as S1 for Vaganovo site (VGN).

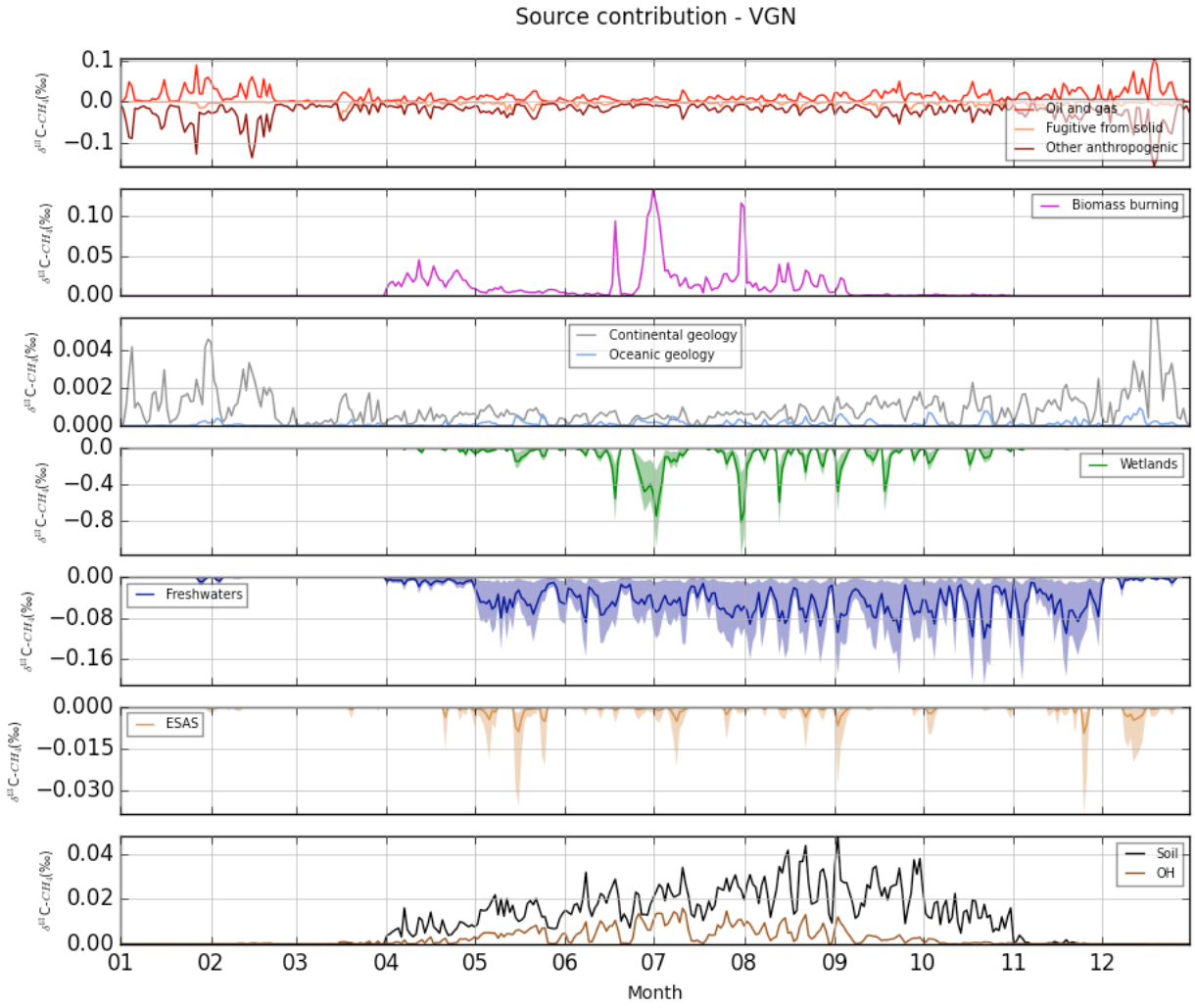

Figure S22. Same as S1 for Yakutsk site (YAK).

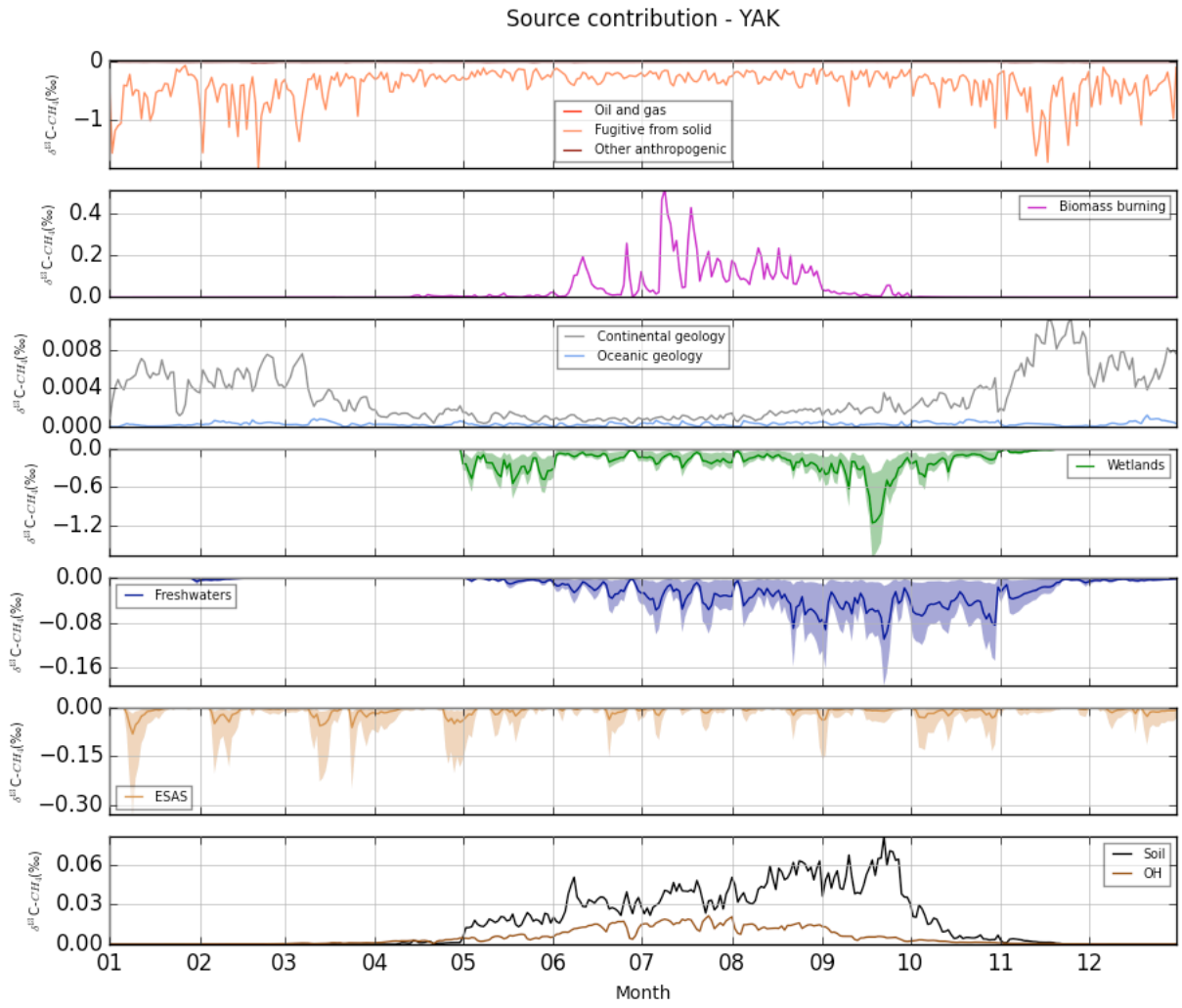

Figure S23. Same as S1 for Zottino site (ZOT).

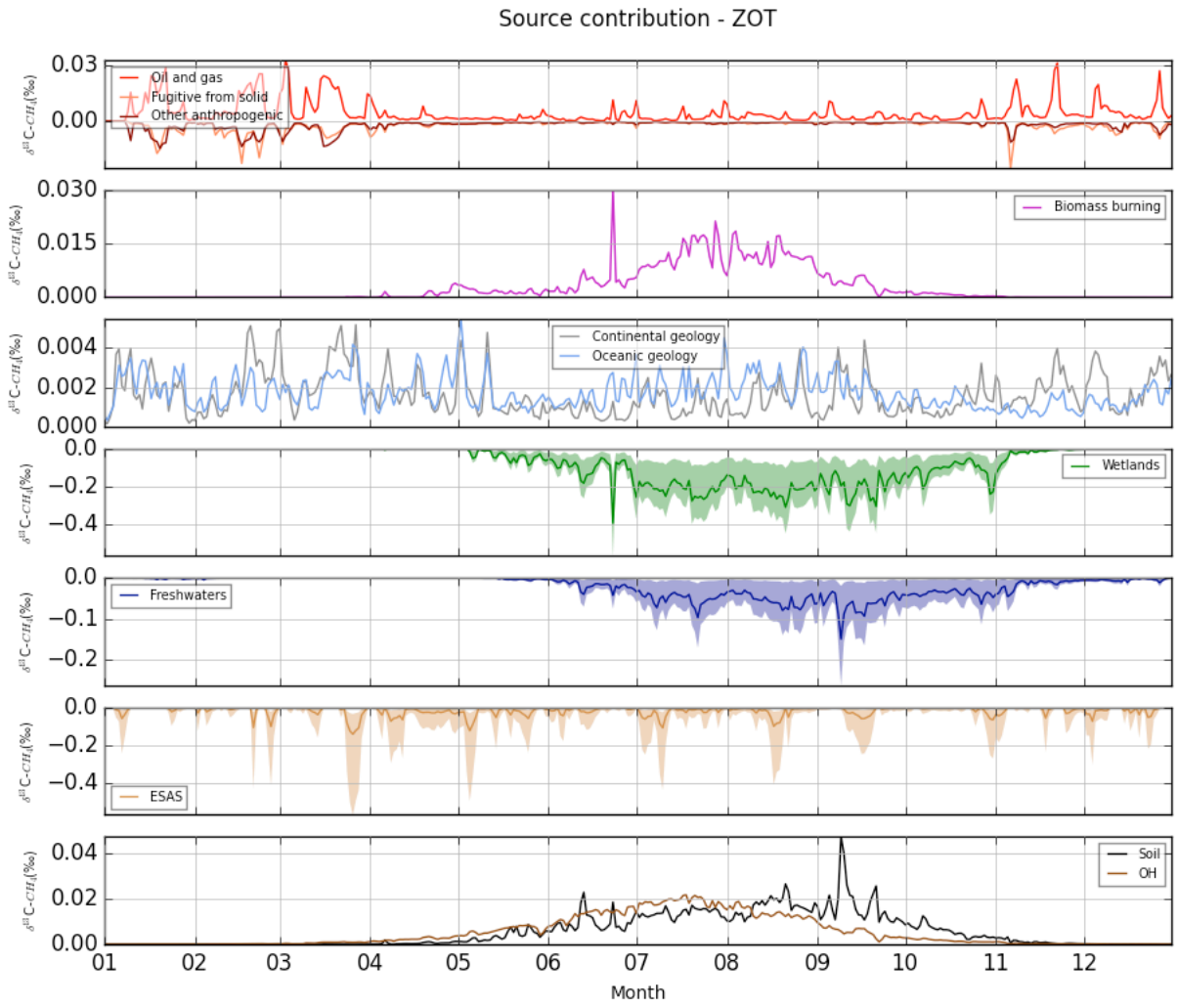

Figure S24. Number of days in 2012 when simulated daily direct contributions of Arctic sources to the $\delta^{13}C\text{-}CH_4$ value are above given thresholds, in Alert (ALT). The coloured shades indicate the dominant Arctic source in terms of $\delta^{13}C\text{-}CH_4$ contribution. The plain and dashed black lines represent the total number of days but using various wetland signatures (from the heavier to the lighter scenario). (Note the non-linear scale for the x-axis.)

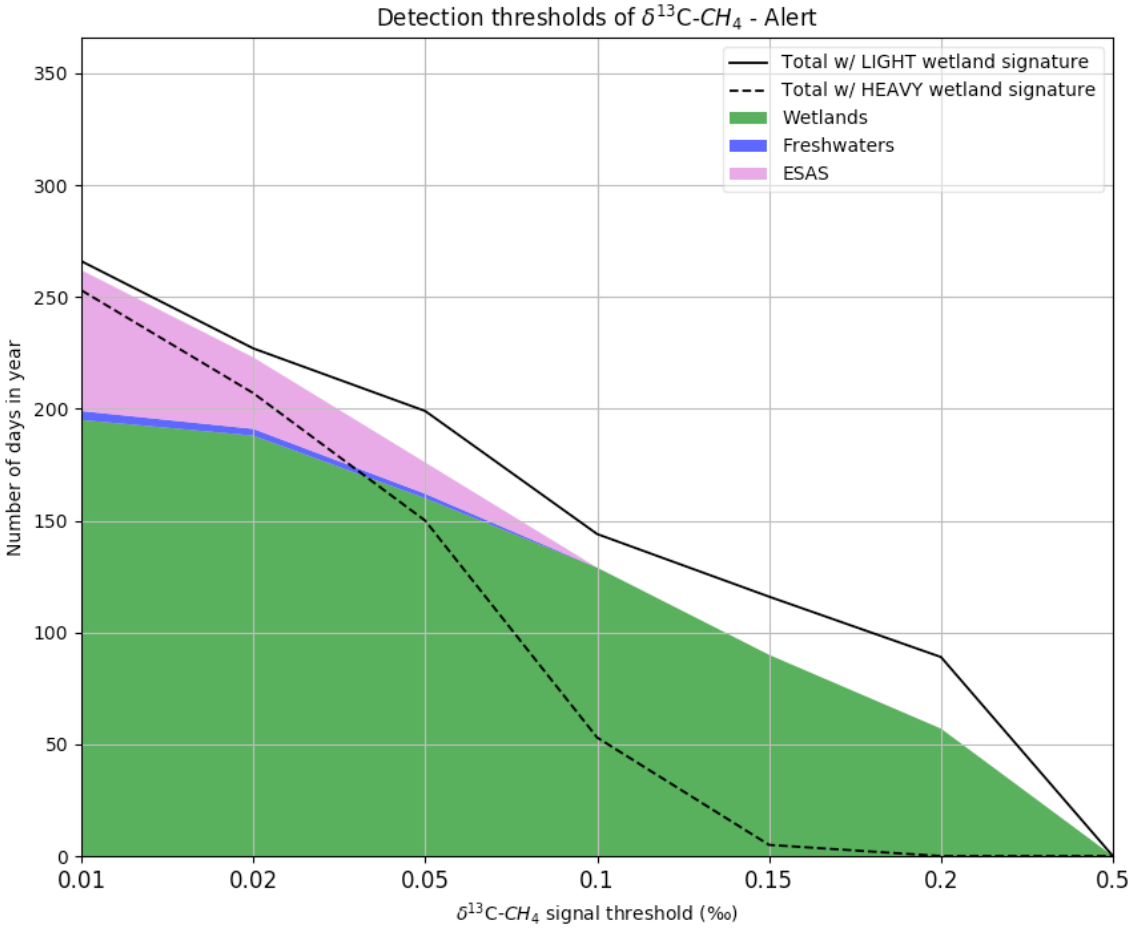

Figure S25. Same as S24 for Ambarchik site (AMB).

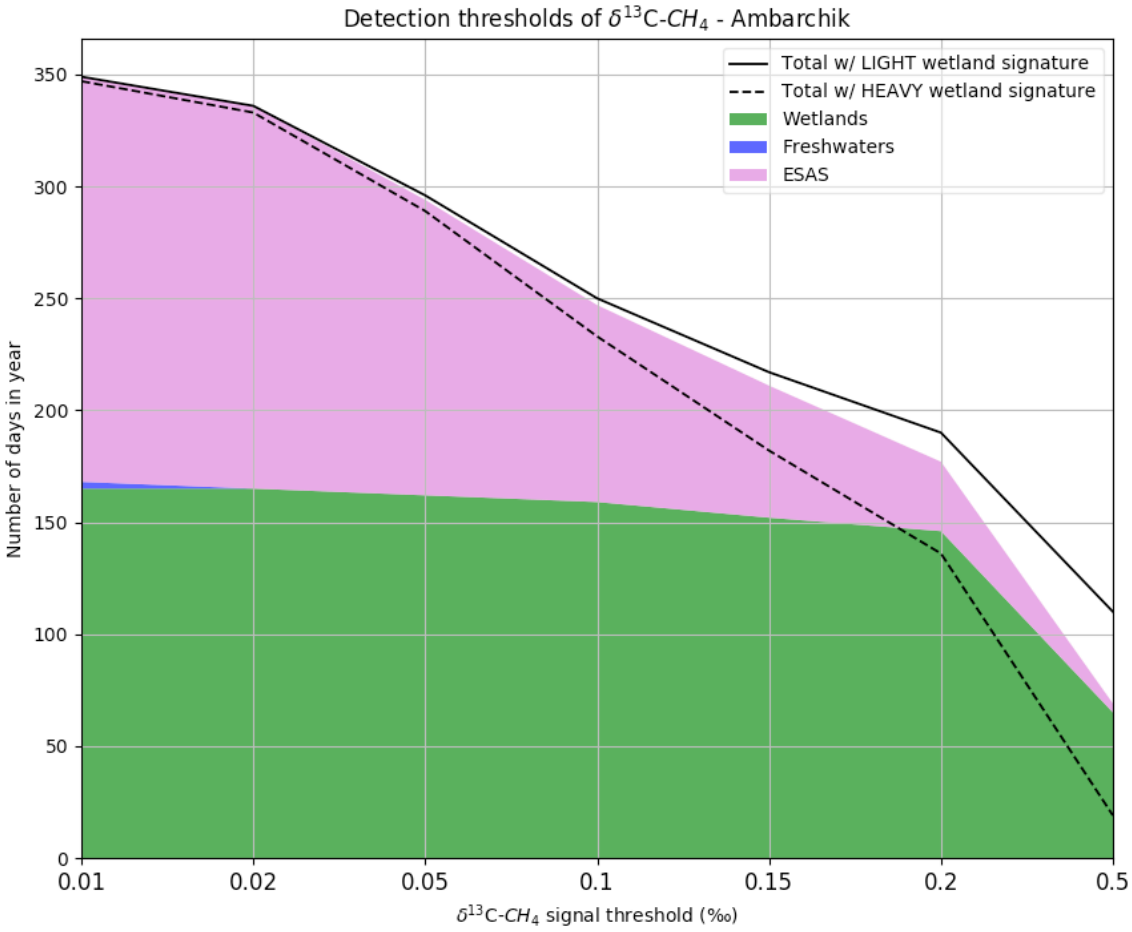

Figure S26. Same as S24 for Baker Lake site (BKL).

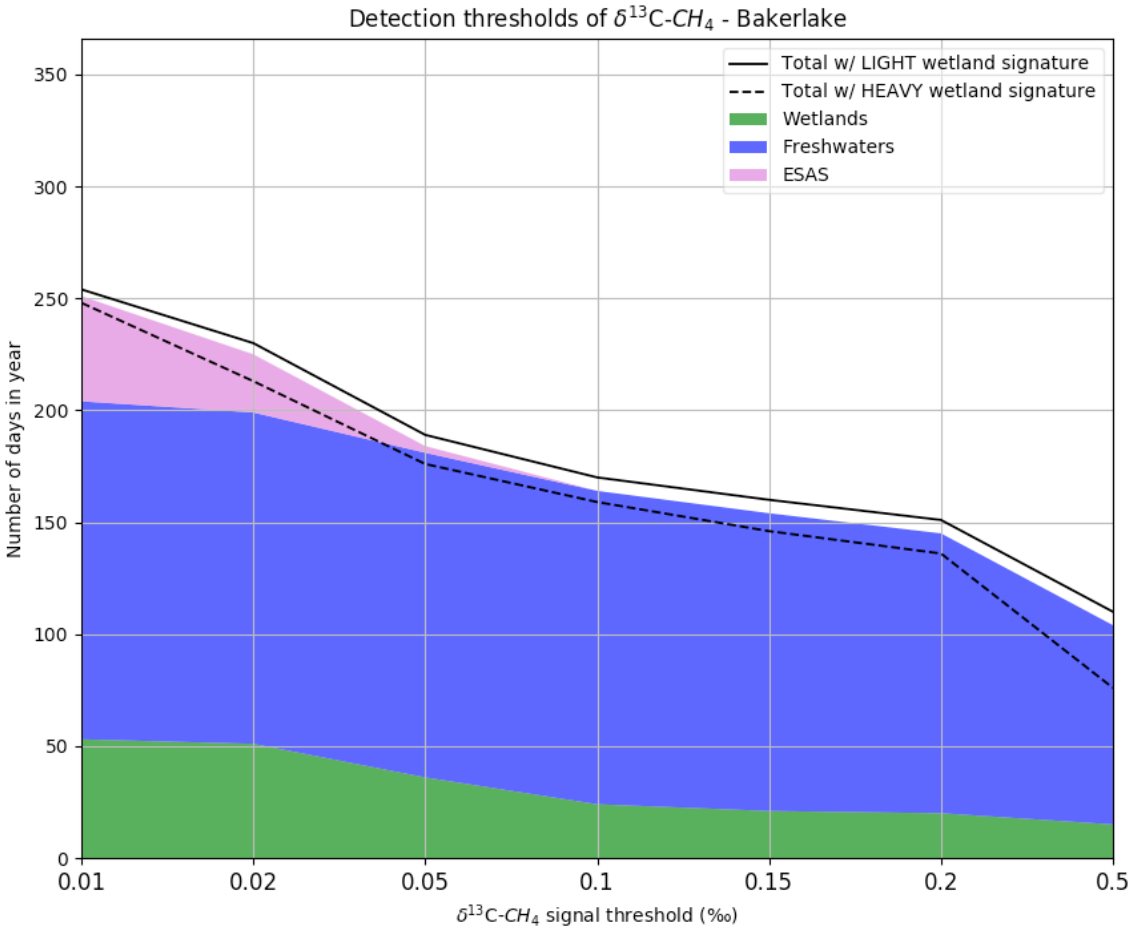

Figure S27. Same as S24 for Barrow site (BRW).

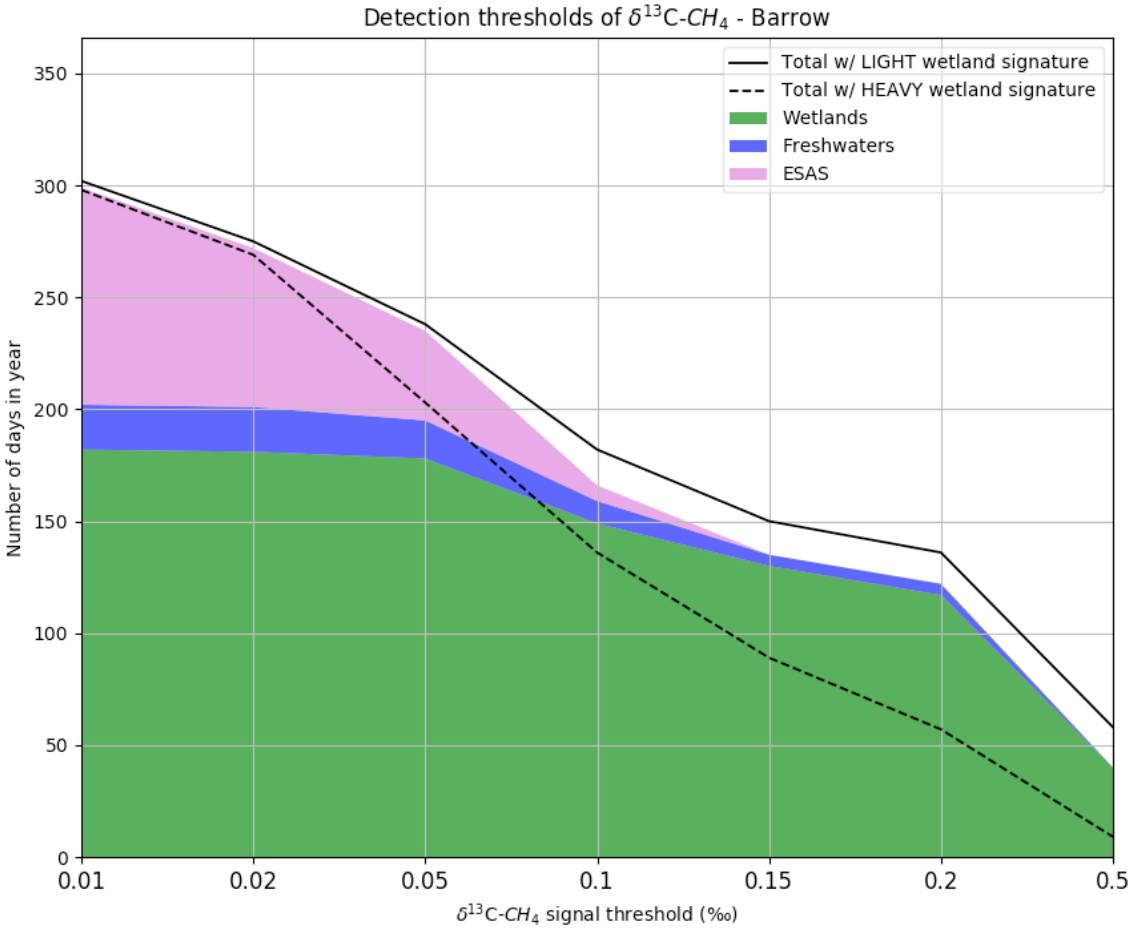

Figure S28. Same as S24 for Behchoko site (BCK).

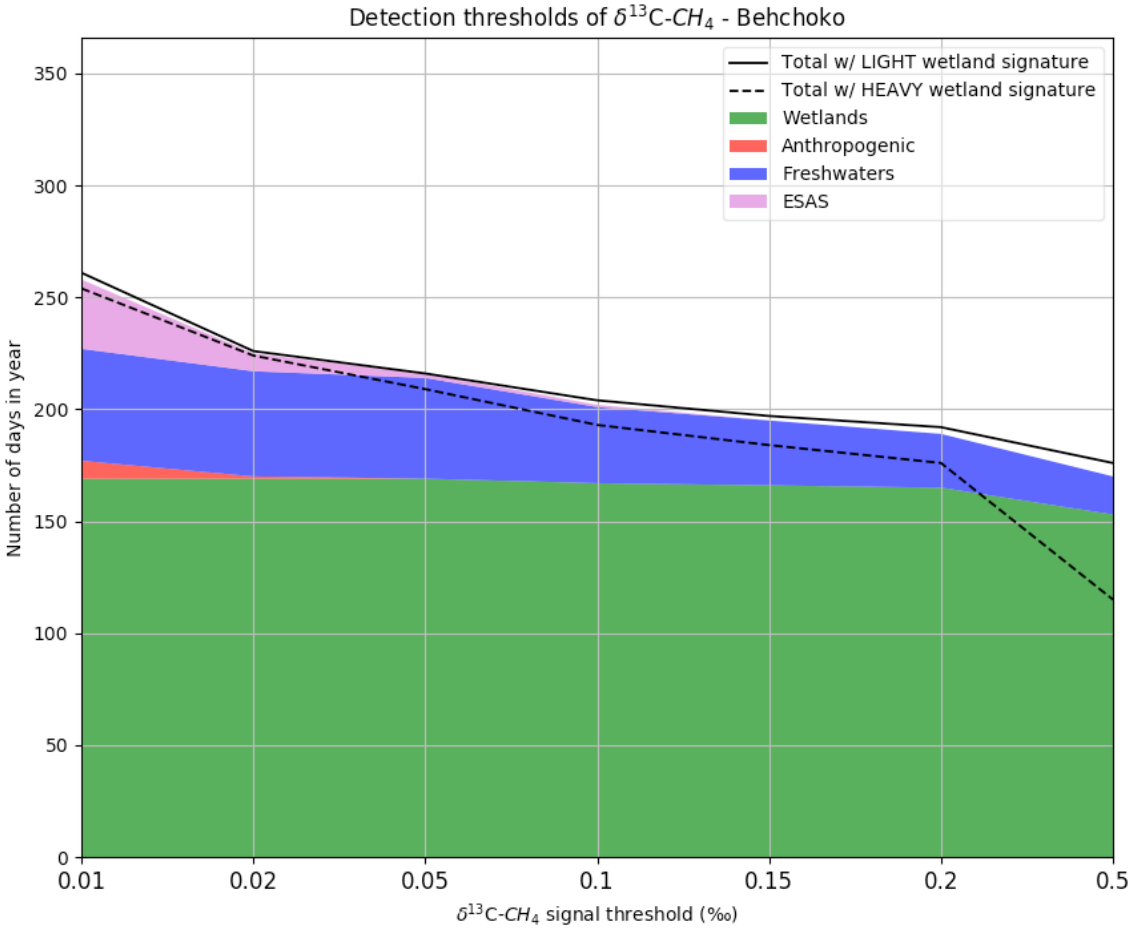

Figure S29. Same as S24 for Cambridge Bay site (CBB).

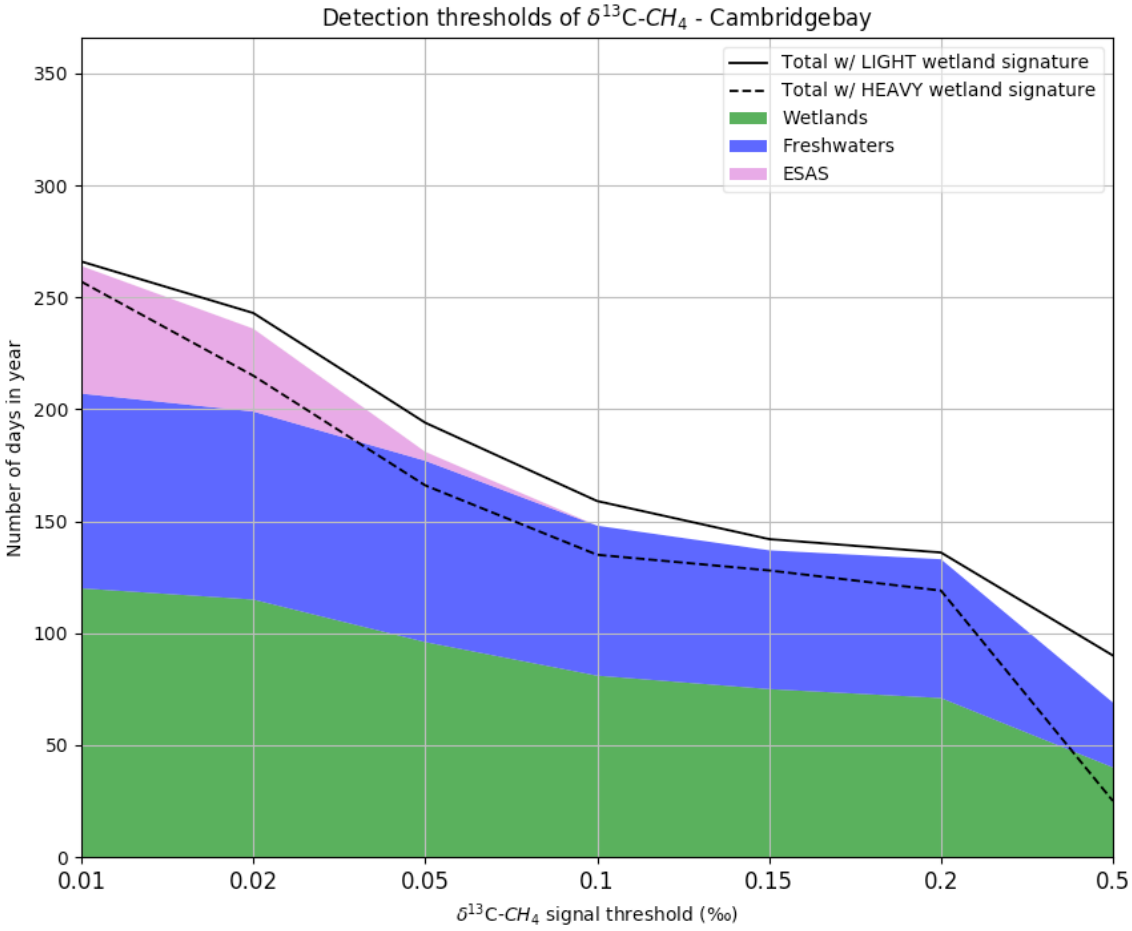

Figure S30. Same as S24 for CARVE Tower site (CAR).

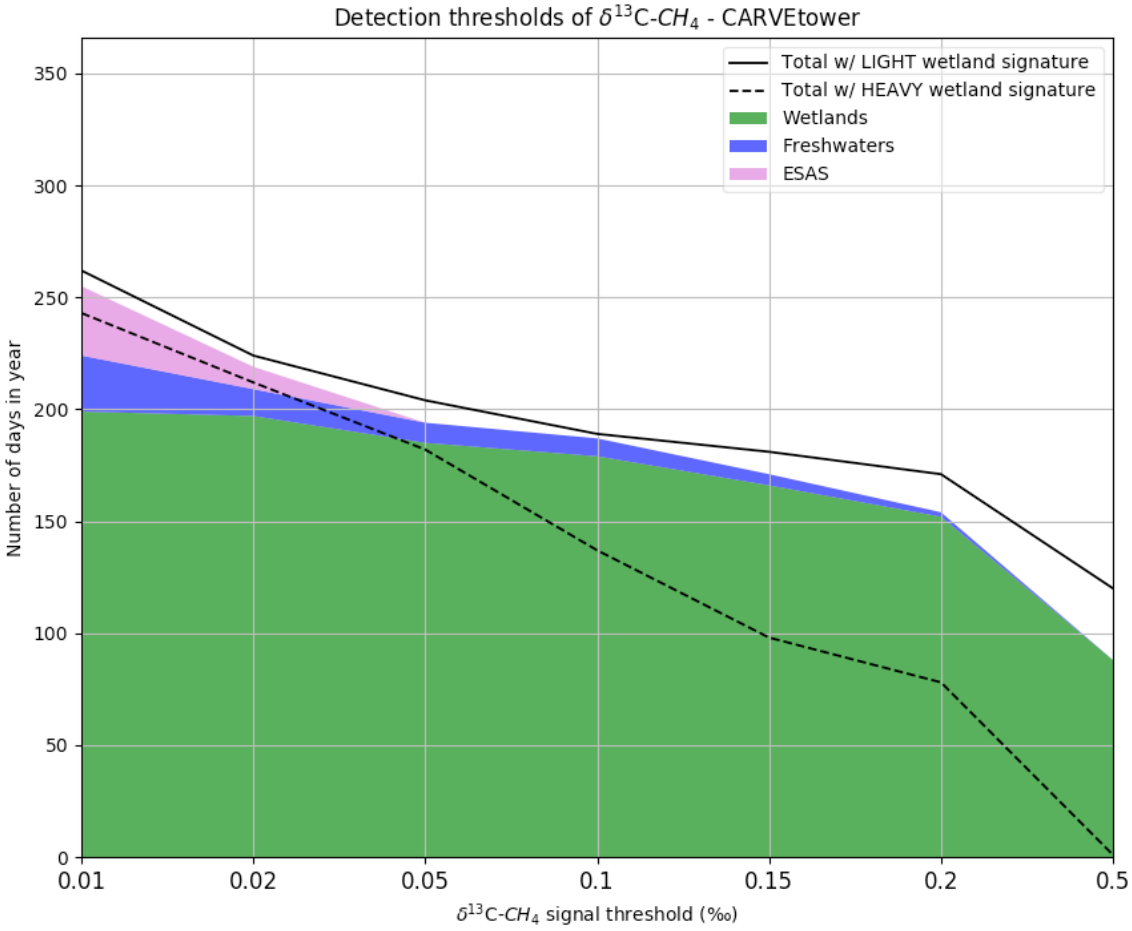

Figure S31. Same as S24 for Cherskii site (CHS).

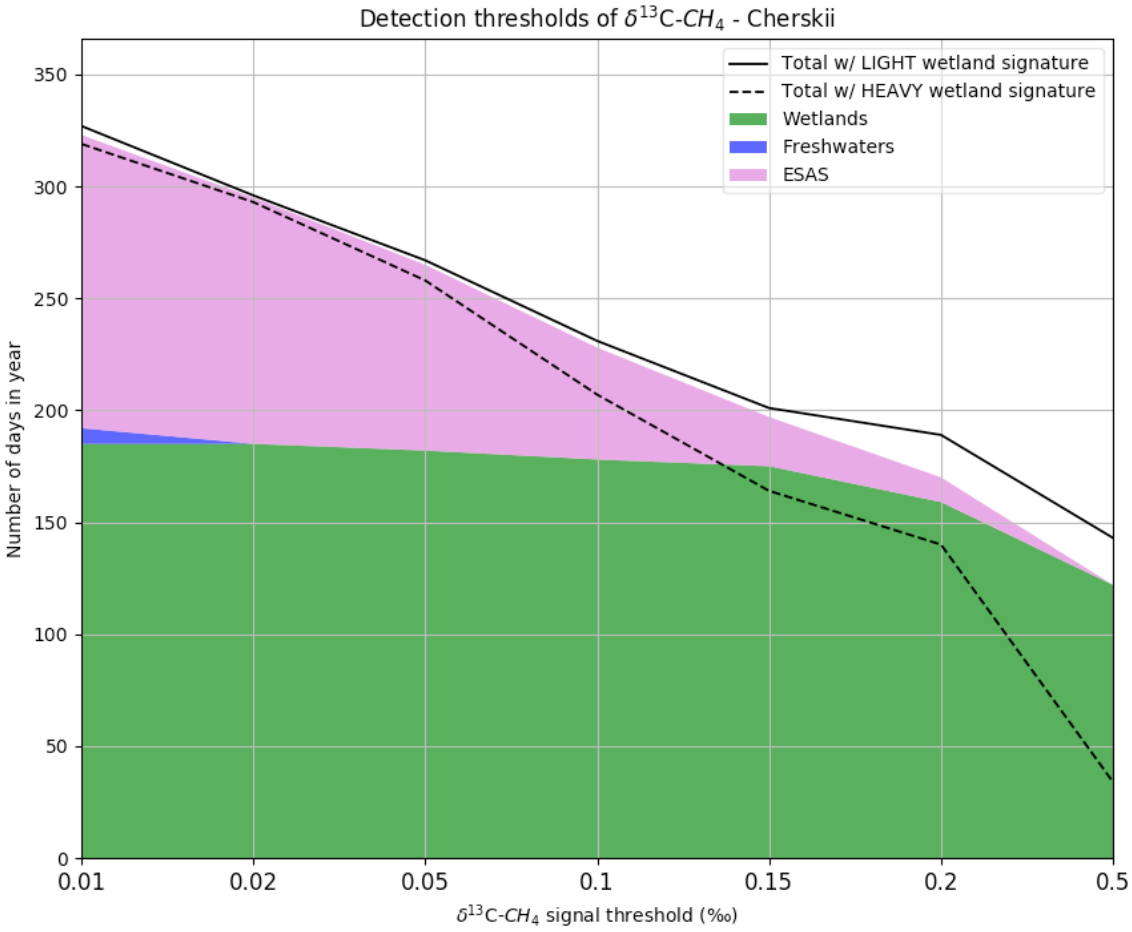

Figure S32. Same as S24 for Churchill site (CHL).

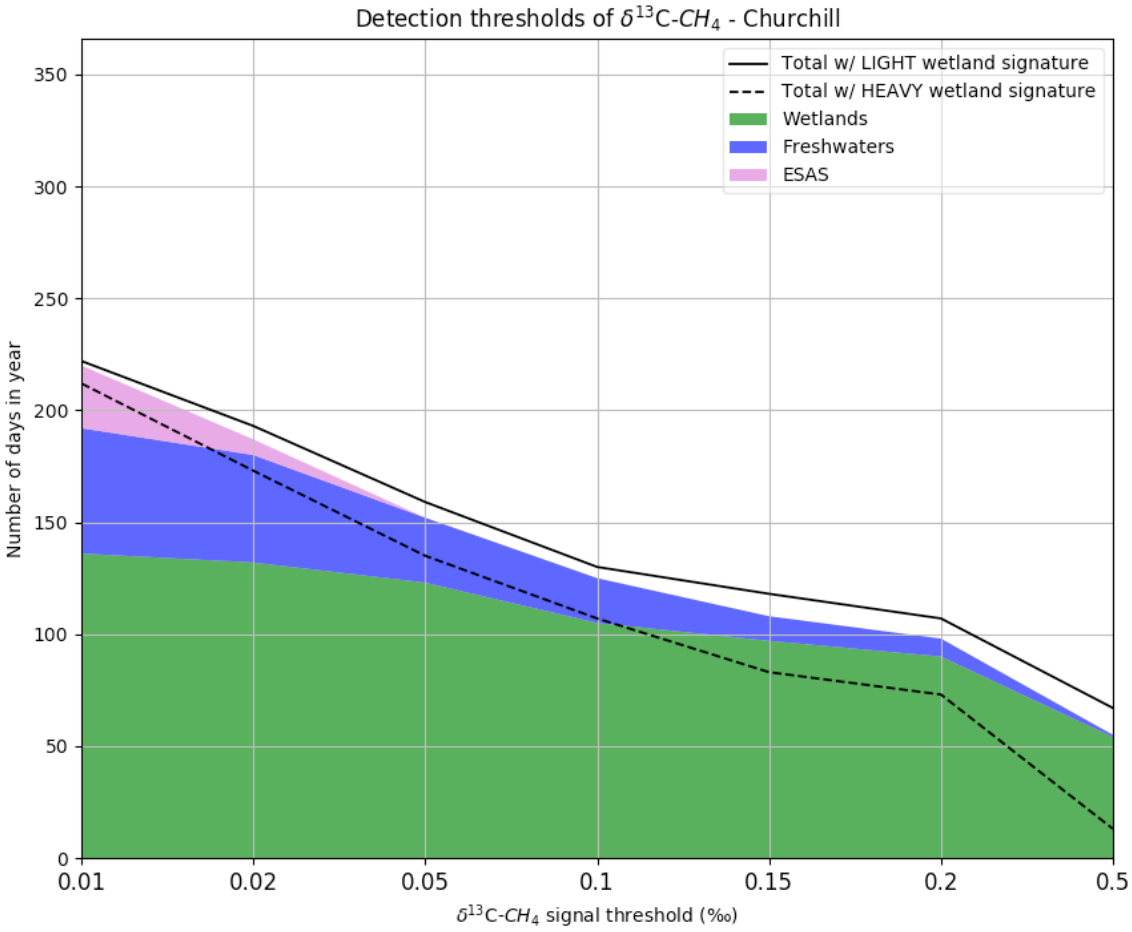

Figure S33. Same as S24 for Cold Bay site (CBA).

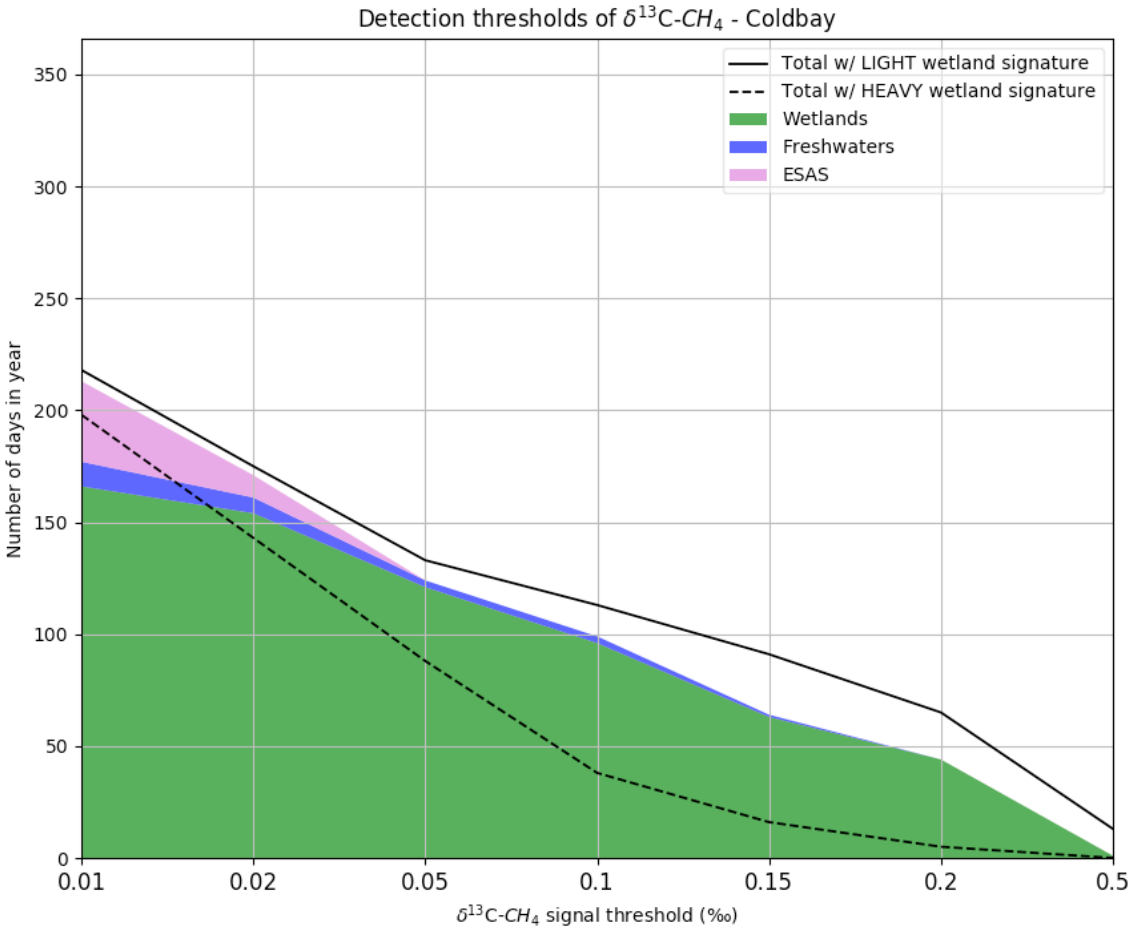

Figure S34. Same as S24 for Demyanskoe site (DEM).

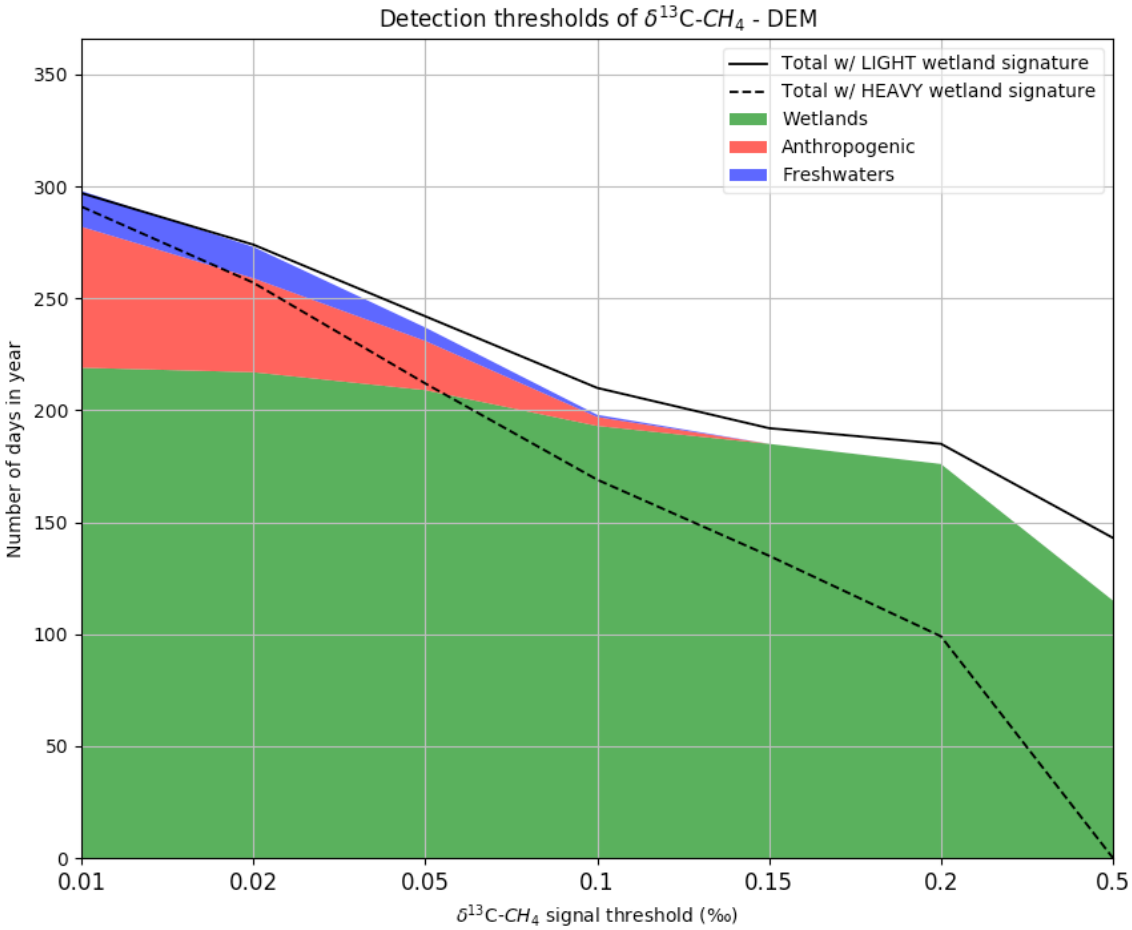

Figure S35. Same as S24 for Igrim site (IGR).

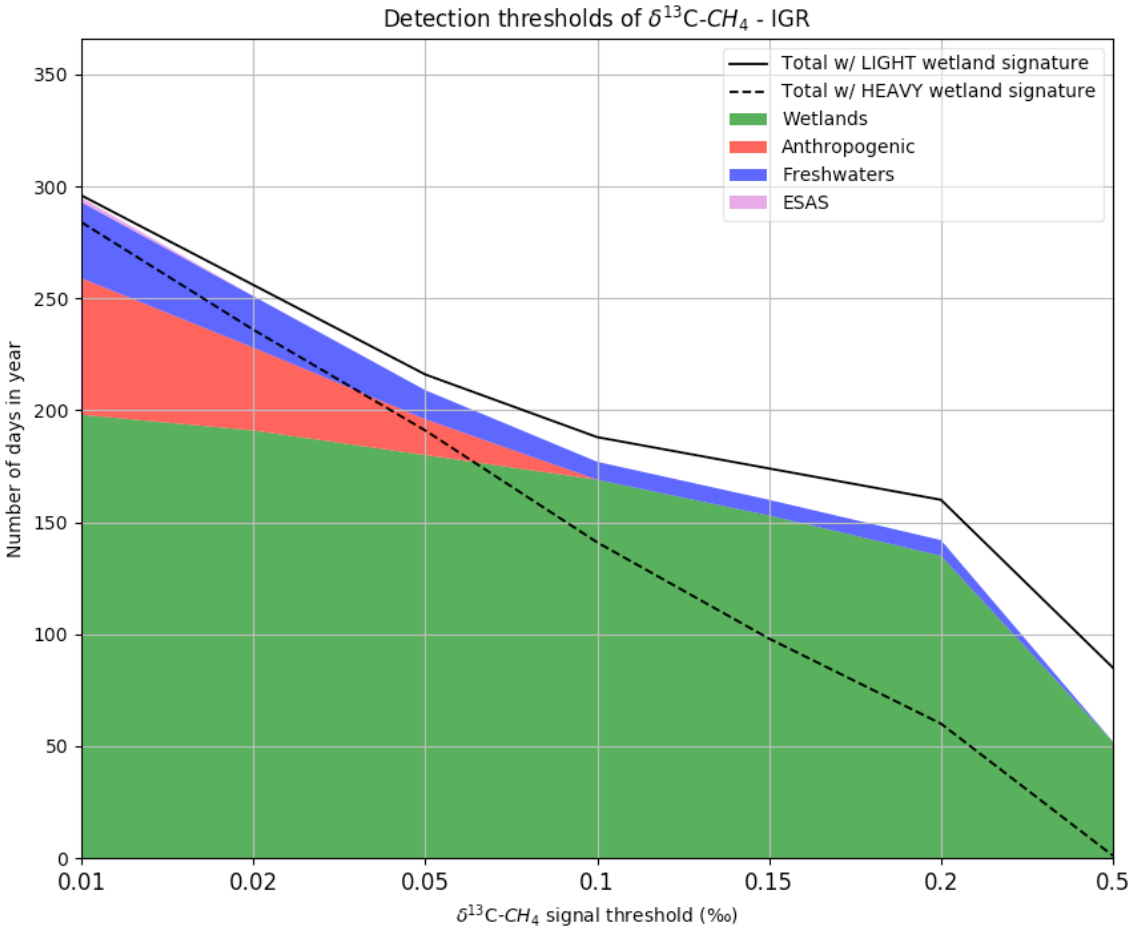

Figure S36. Same as S24 for Inuvik site (INU).

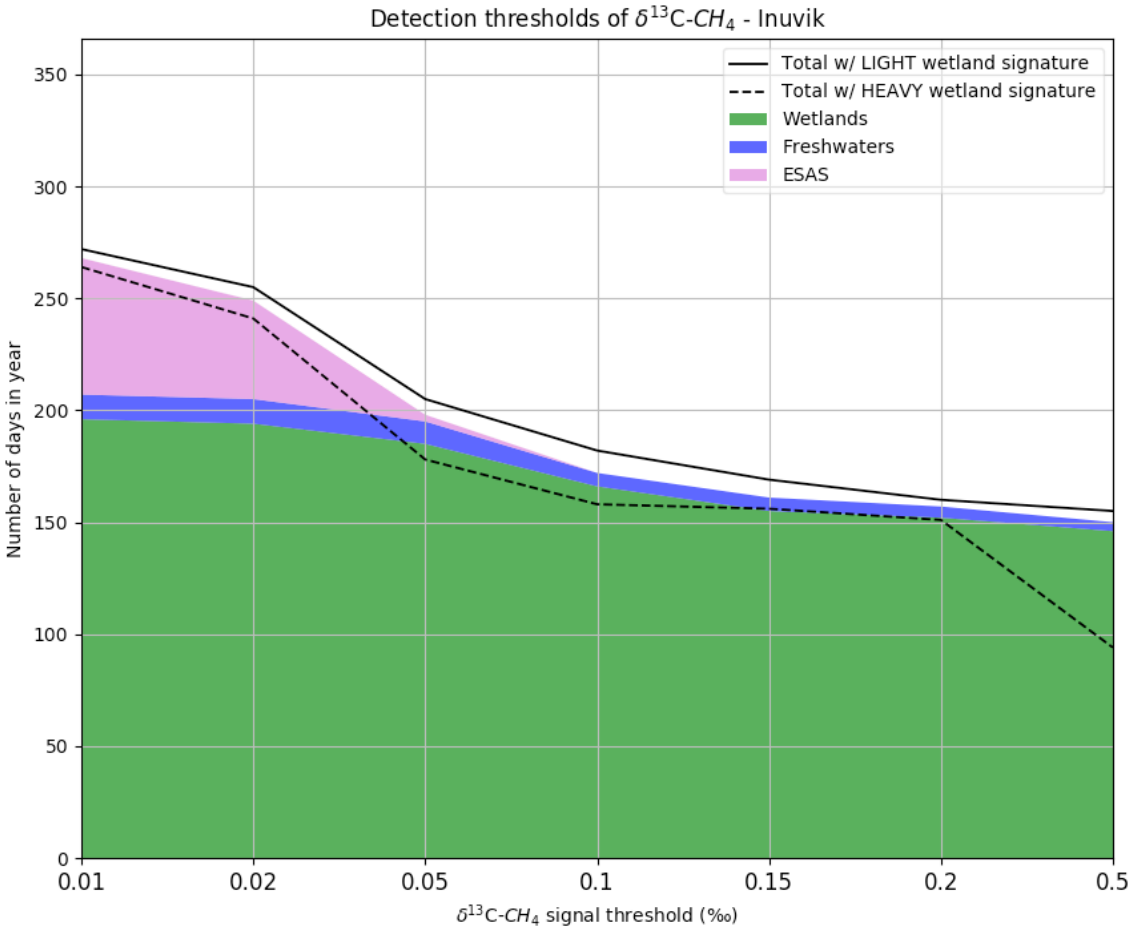

Figure S37. Same as S24 for Karasevoe site (KRS).

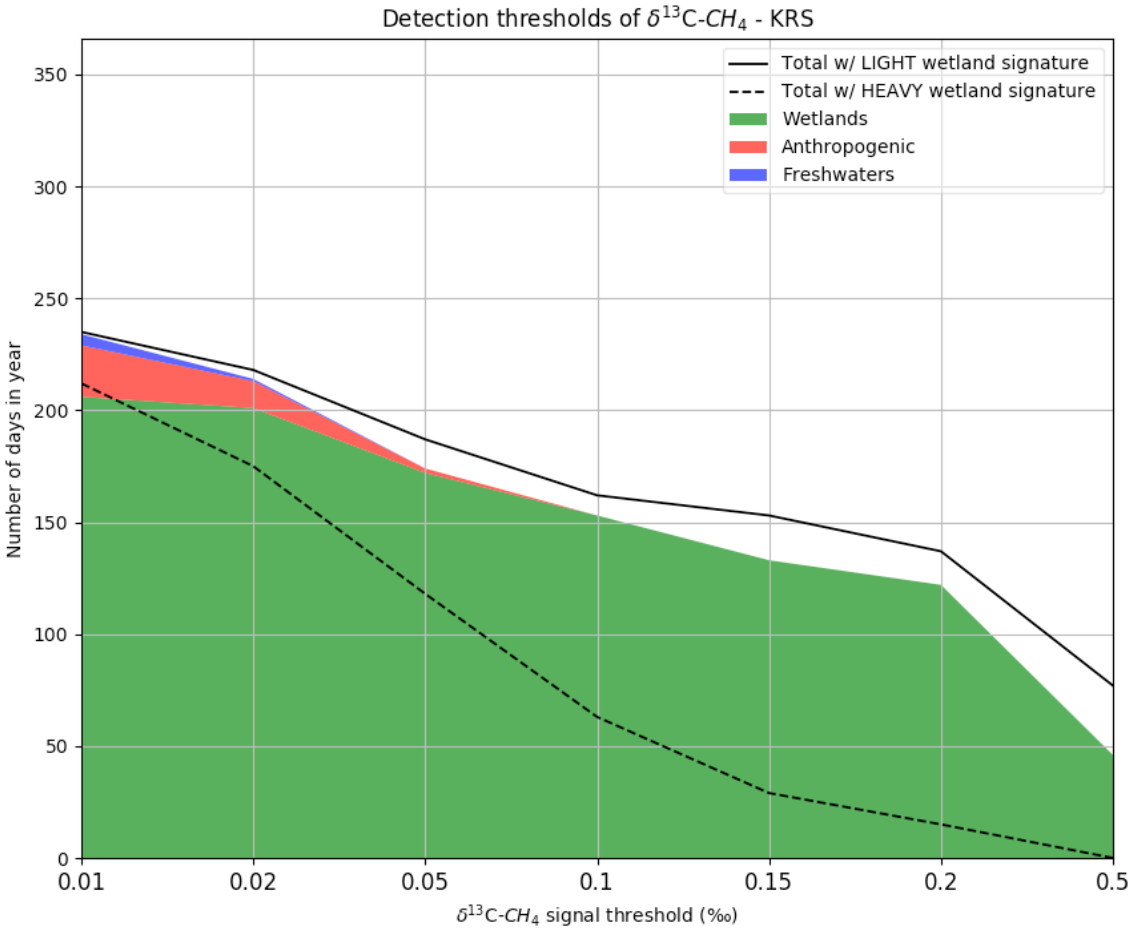

Figure S38. Same as S24 for Noyabrsk site (NOY).

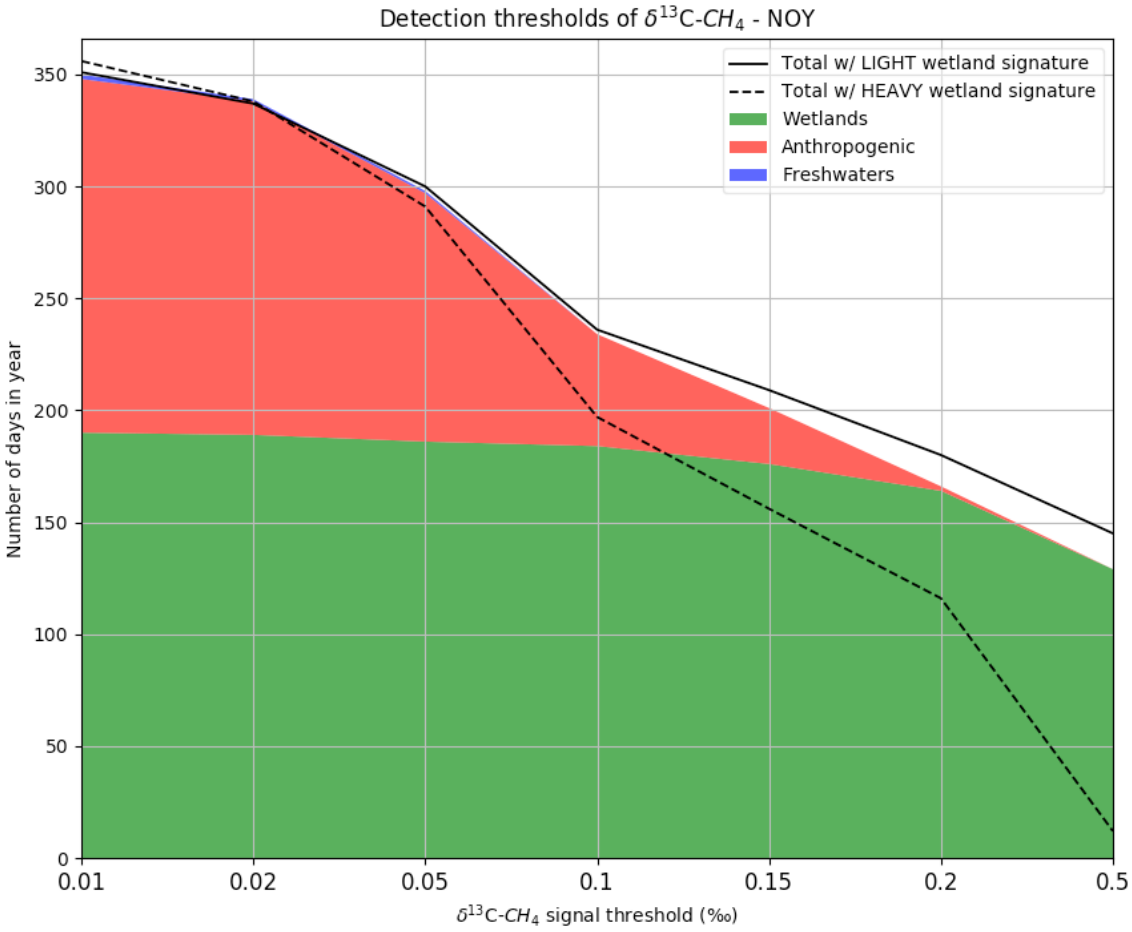

Figure S39. Same as S24 for Pallas site (PAL).

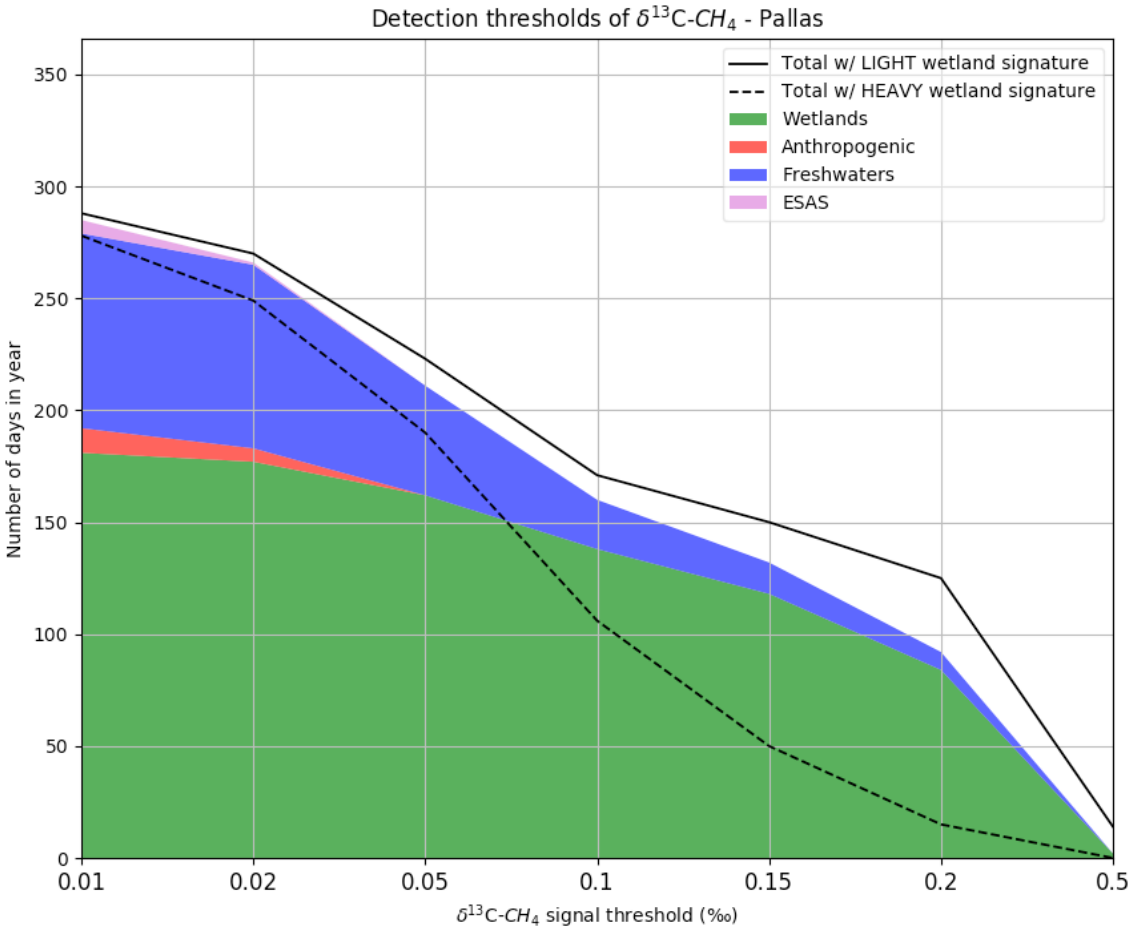

Figure S40. Same as S24 for Storhofdi site (ICE).

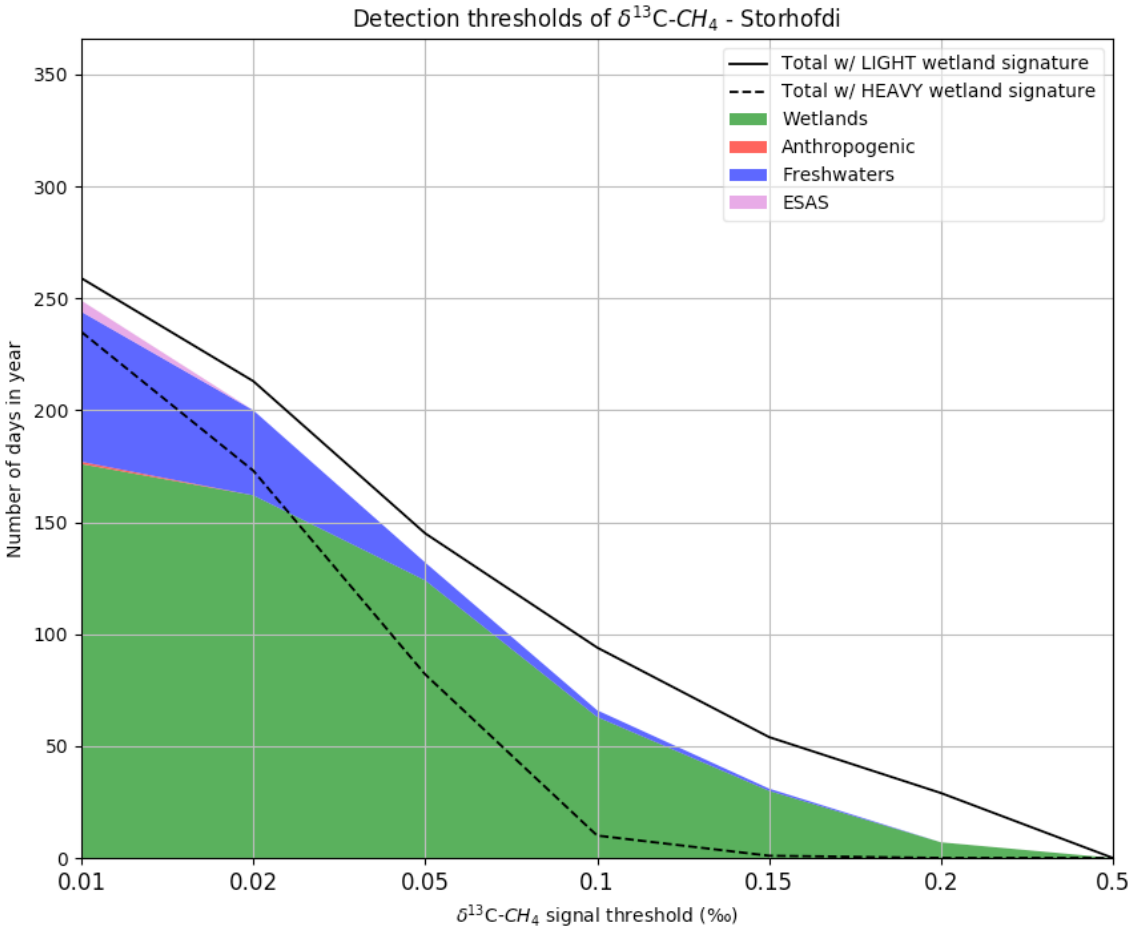

Figure S41. Same as S24 for Summit site (SUM).

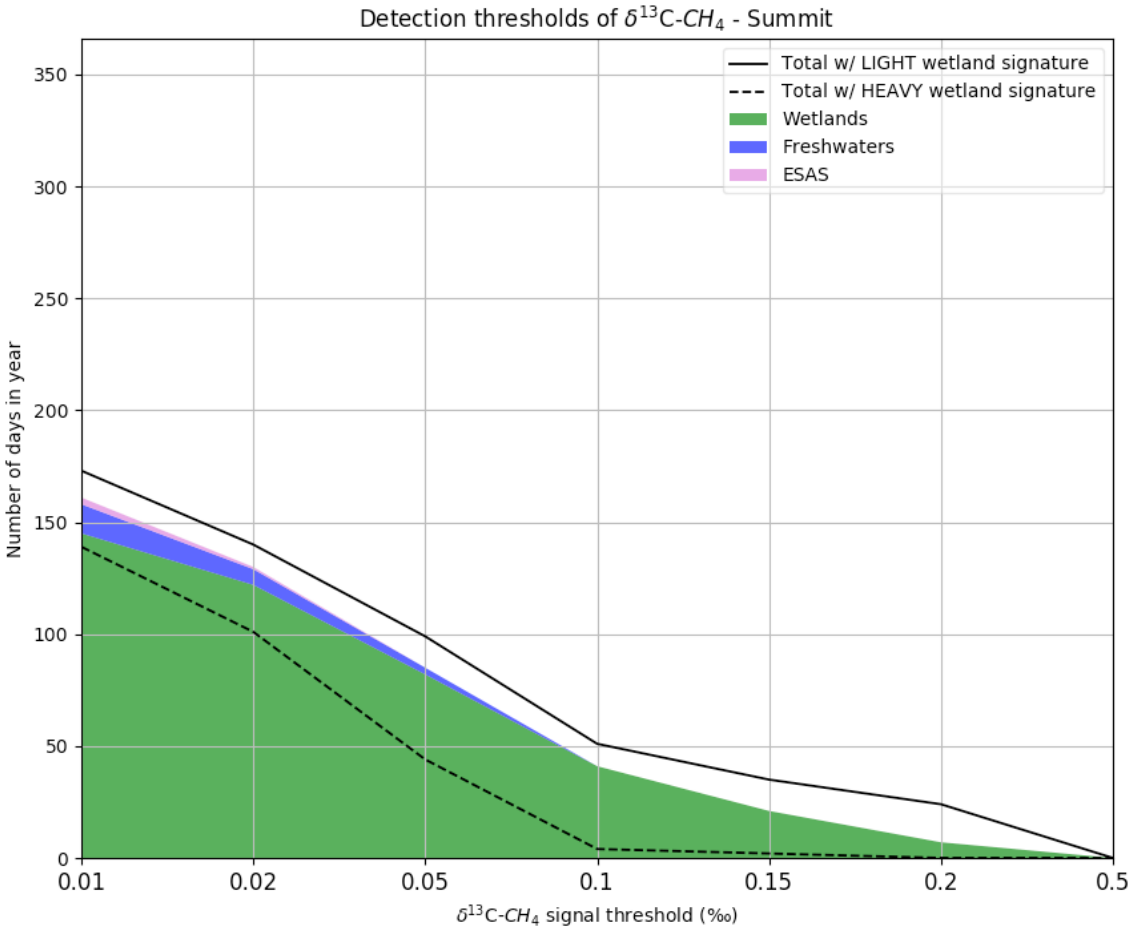

Figure S42. Same as S24 for Teriberka site (TER).

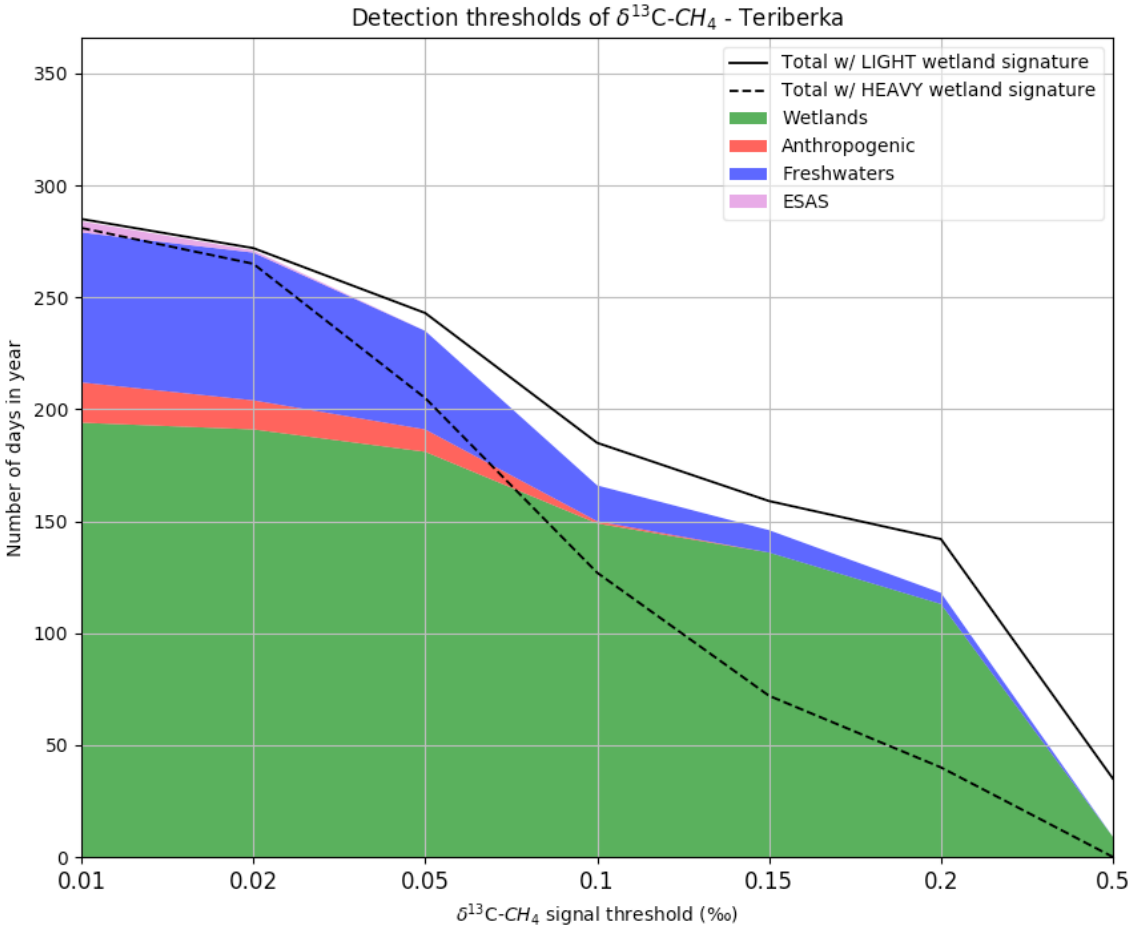

Figure S43. Same as S24 for Tiksi site (TIK).

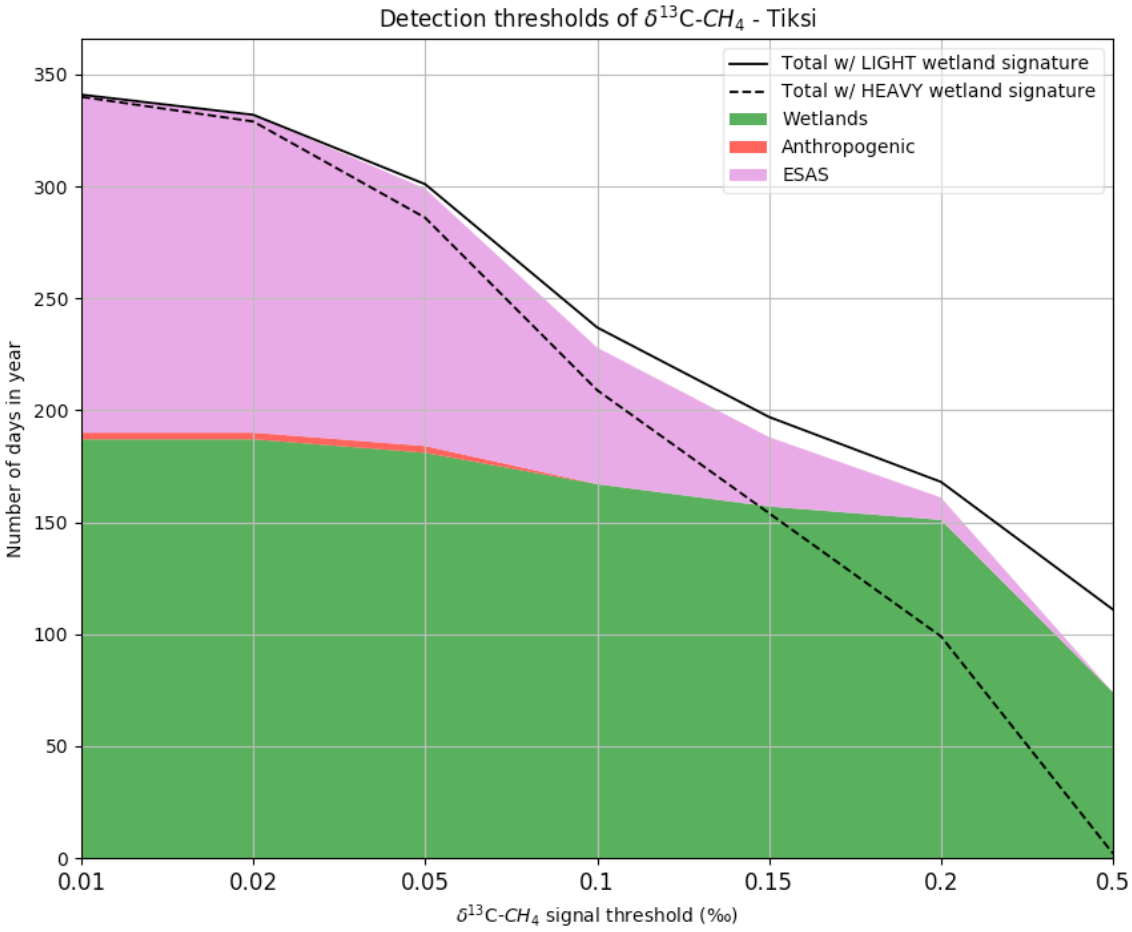

Figure S44. Same as S24 for Vaganovo site (VGN).

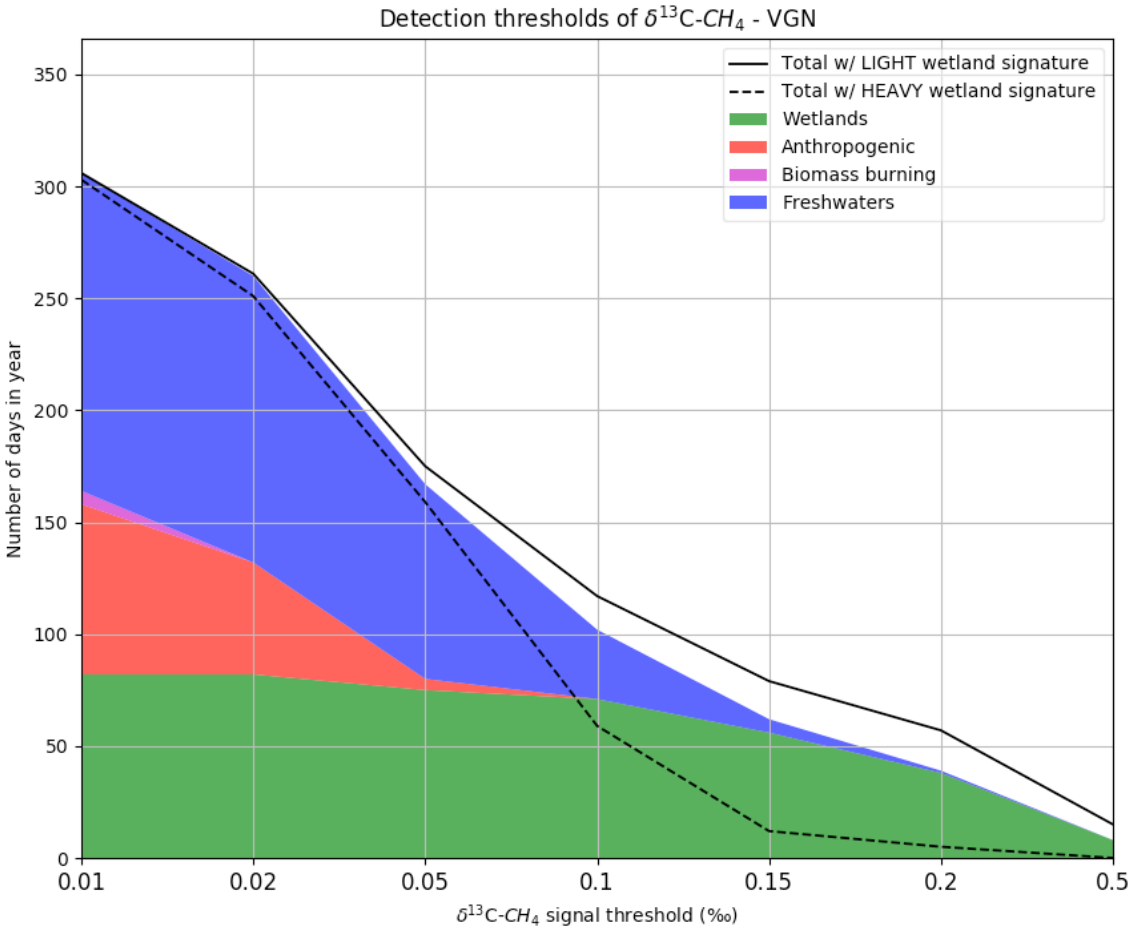

Figure S45. Same as S24 for Yakutsk site (YAK).

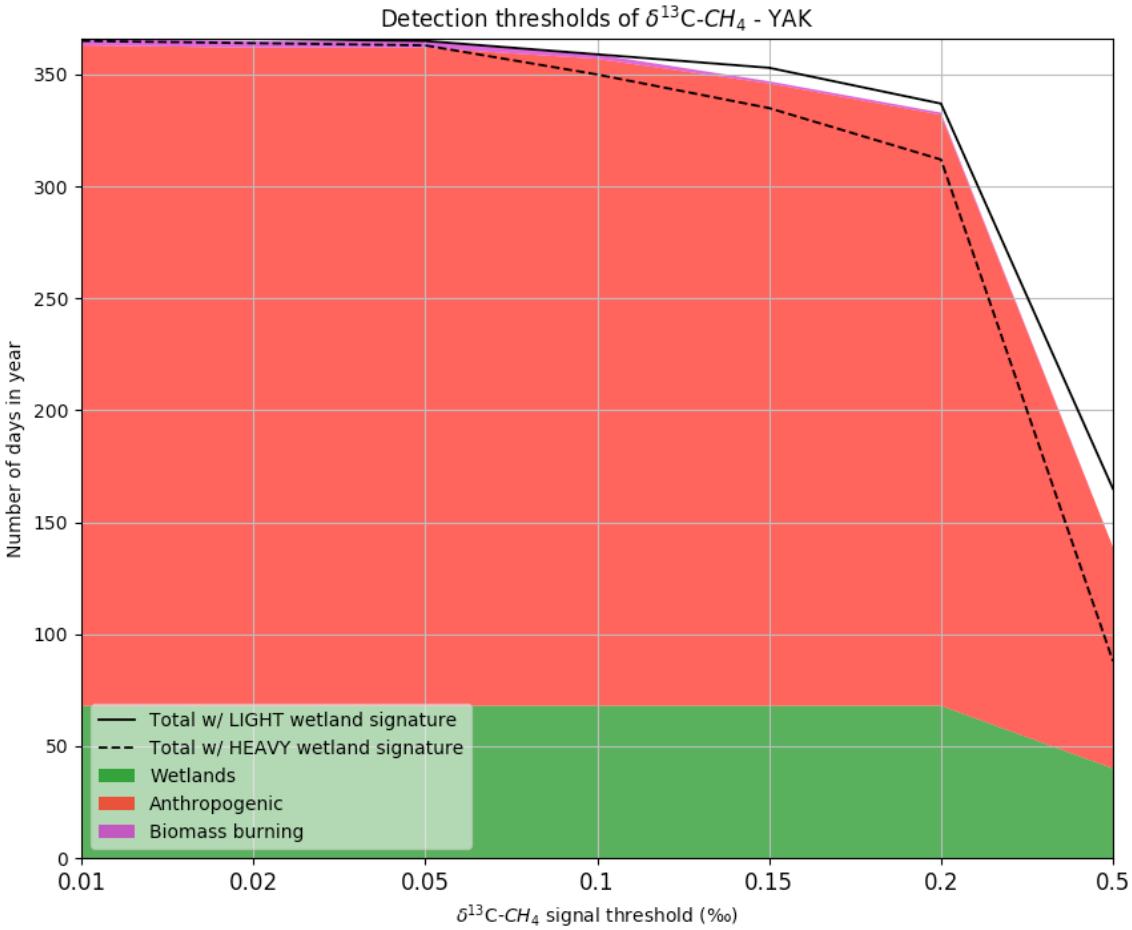

Figure S46. Same as S24 for Zottino site (ZOT).