



Supplement of

Atmospheric constraints on the methane emissions from the East Siberian Shelf

A. Berchet et al.

Correspondence to: A. Berchet (antoine.berchet@empa.ch)

The copyright of individual parts of the supplement might differ from the CC-BY 3.0 licence.

1 Footprint analysis

The influence of every methane emission contribution (anthropogenic, wetlands, ESAS) is explicitly computed at the observation sites for every hour of the year 2012. However, as a visualisation tool, we show here some monthly footprints by observation site to display the regions influencing the most each observation site depending on meteorological conditions.

The footprints are computed with the Lagrangian dispersion model FLEXPART version 8.2.3 (Stohl et al., 2005). We compute numerous back-trajectories of virtual particles from the observation sites for every hour of the period of interest. The footprints are computed on a $0.5^\circ \times 0.5^\circ$ horizontal grid, following the method of Lin et al. (2003). The model is forced by ECMWF ERA-Interim data at an horizontal resolution of $1^\circ \times 1^\circ$, with 60 vertical levels and 3 hours temporal resolution (Uppala et al., 2005). Virtual particles with 10-day lifetime backwards in time are released in a 3D box (10 km per side and 500 m high) centered around each observation site.

Fig S1, S2, S3 and S4 show these footprints for each observation site. TIK site is shown to be influenced mainly by ESAS and by regional wetlands (in the Lena delta and along the shores between Lena and Indigirka rivers), but also by the Lena river basin and by emissions along the North Siberian shores. Depending on the wind regime, BRW can be either influenced by North American sources, or by ESAS emissions. ALT is shown to be mainly influenced by North American emissions, but

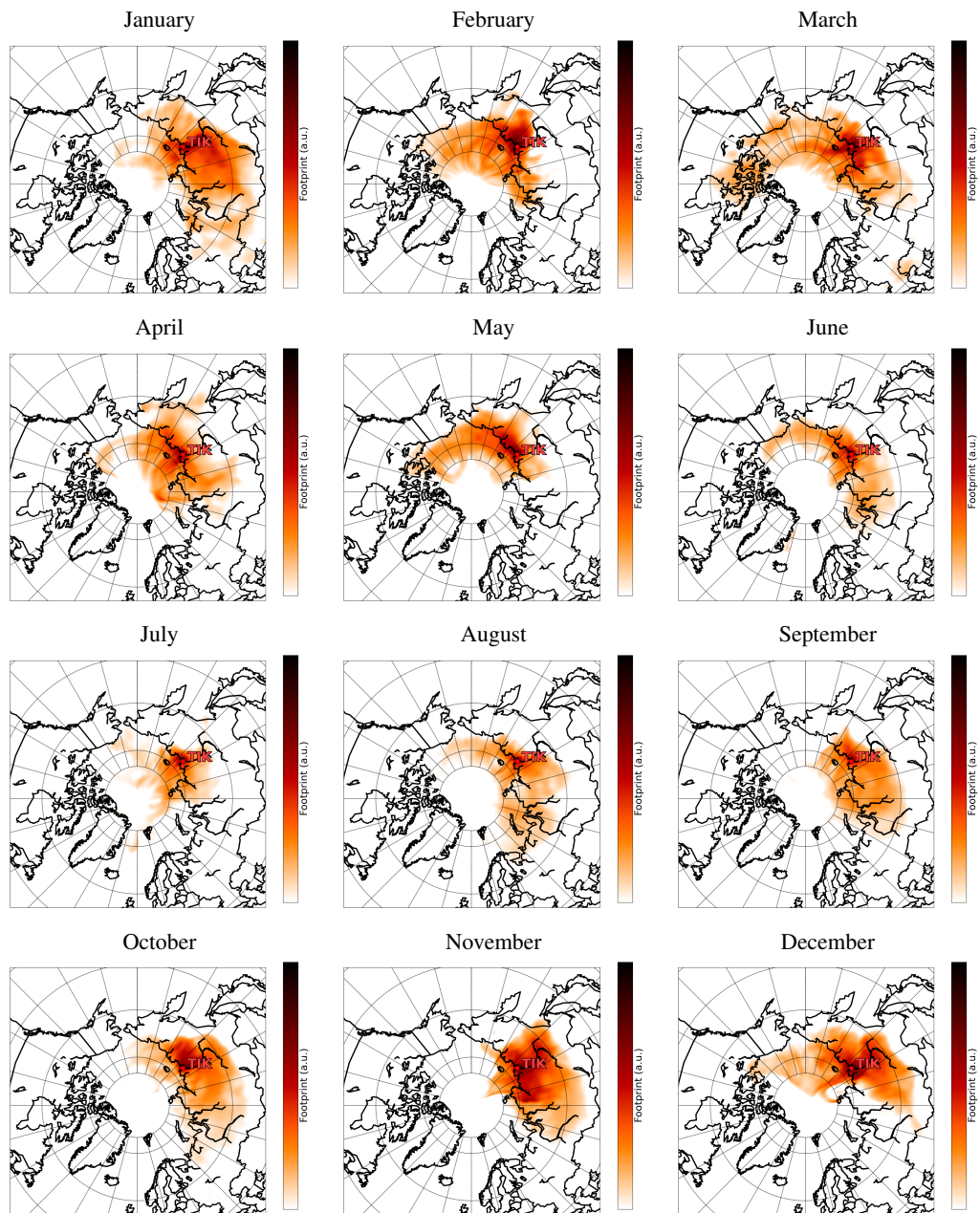


Figure 1: Footprint at TIK site by month of year 2012 (arbitrary unit).

transport from ESAS across the Arctic ocean is also exhibited by the footprints (e.g., especially in February and March).

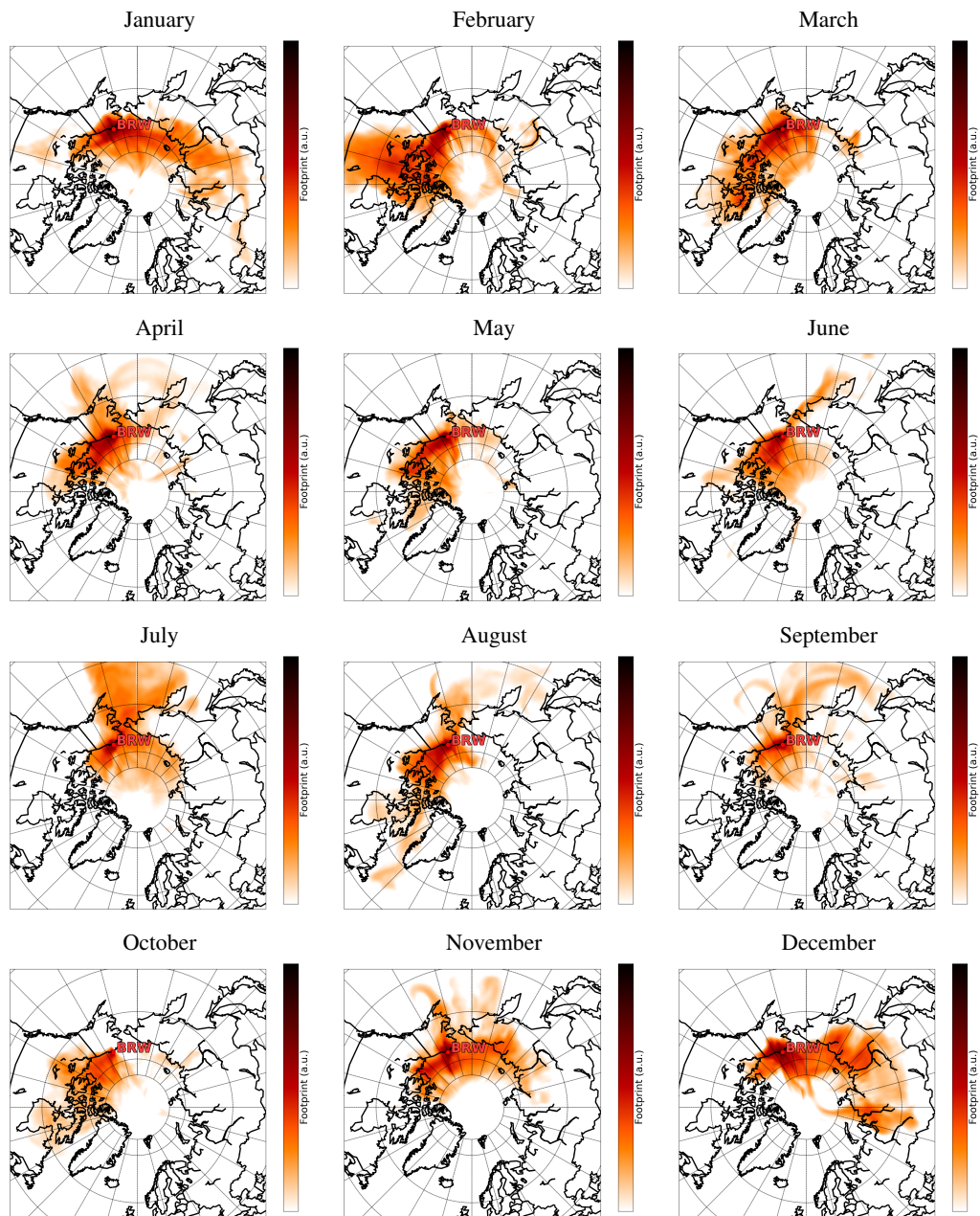


Figure 2: Footprint at BRW site by month of year 2012 (arbitrary unit).

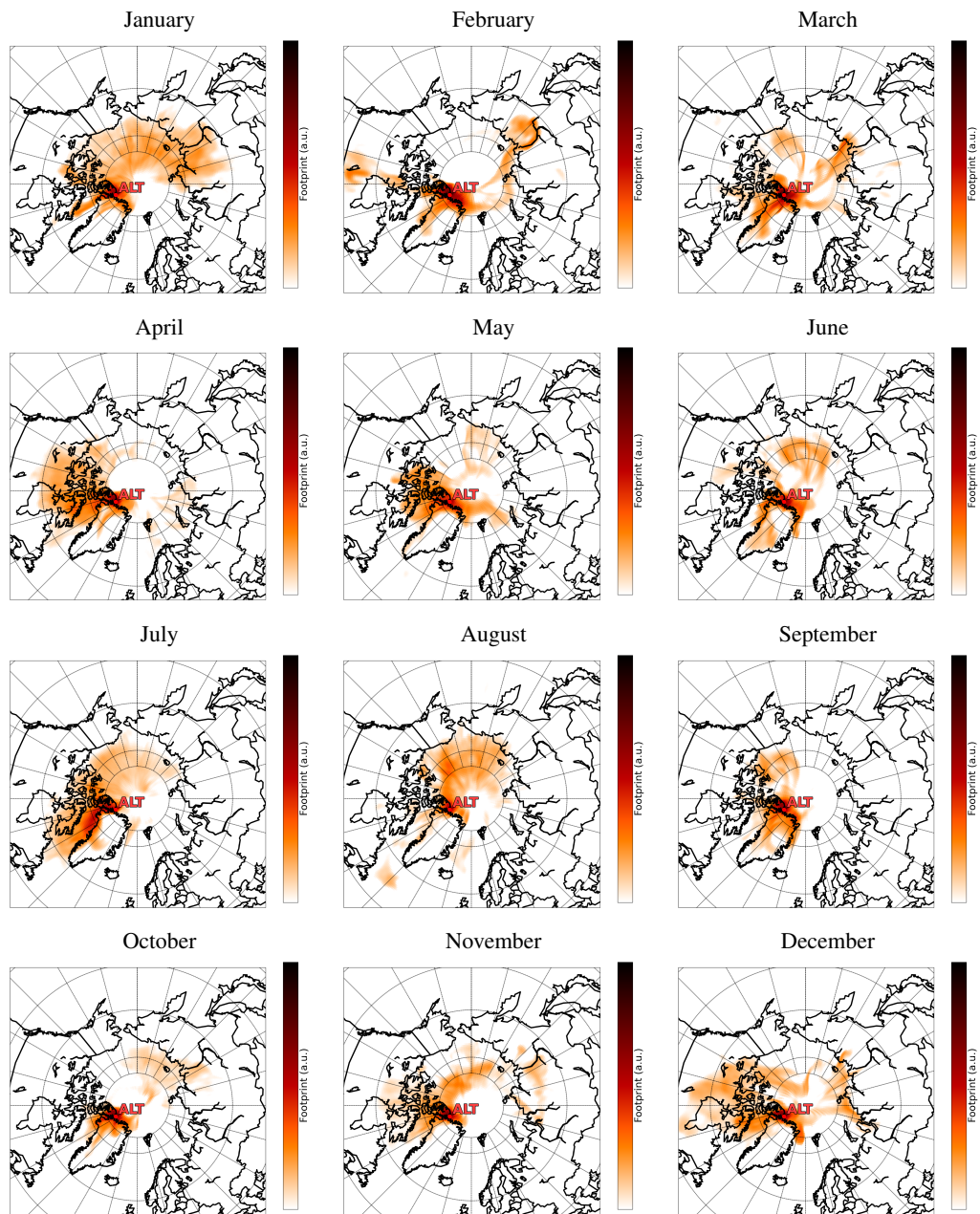


Figure 3: Footprint at ALT site by month of year 2012 (arbitrary unit).

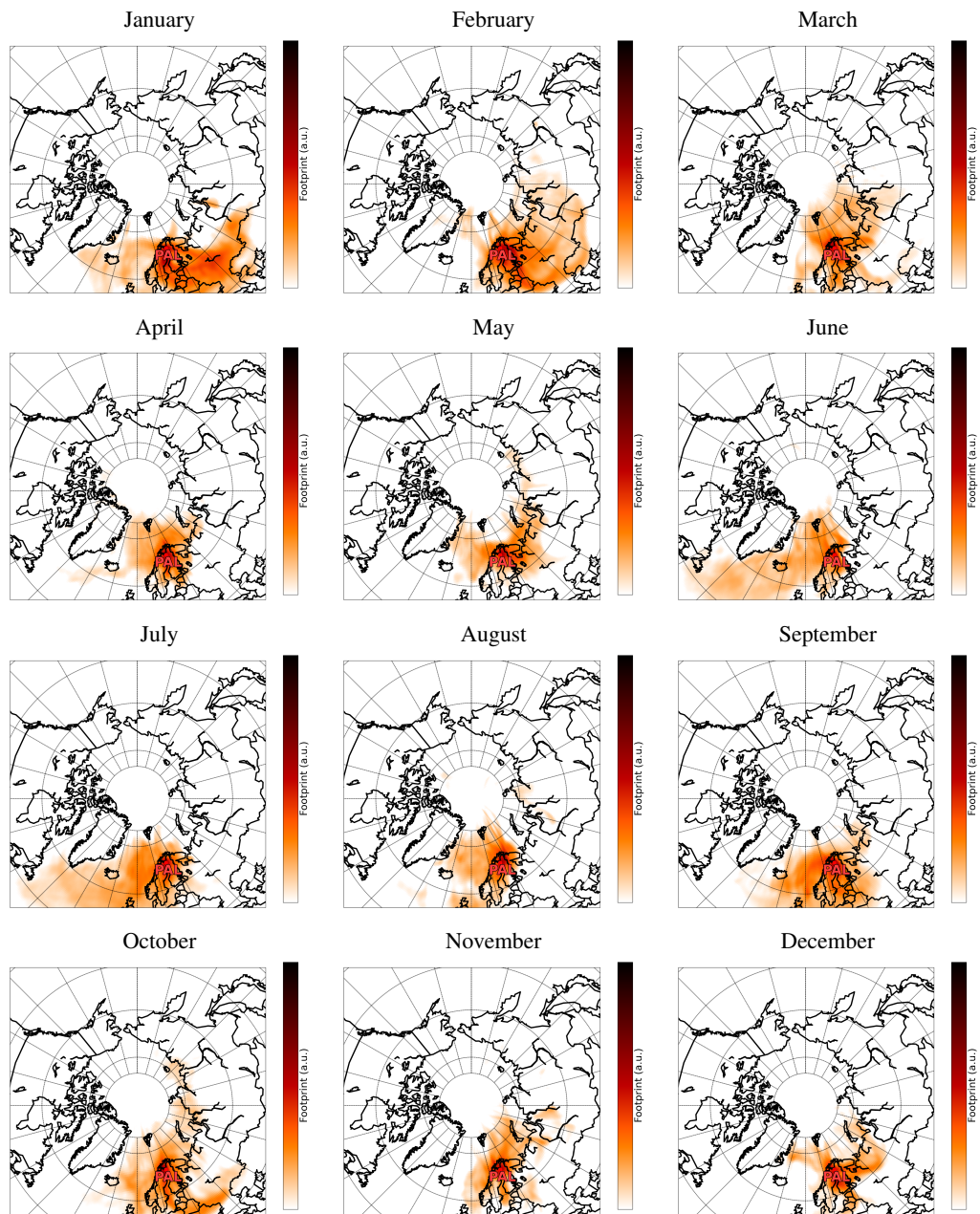


Figure 4: Footprint at PAL site by month of year 2012 (arbitrary unit).