

## Read me

Epron D, Mochidome T, Tanabe T, Dannoura M, Sakabe A. 2022. Variability in stem methane emissions and wood methane production of tree different species in a cold temperate mountain forest. Ecosystems (minor revision)

### File “CH4\_flux.csv” (data used in Figures 1, 2, 3, 4, 6)

Stem CH<sub>4</sub> fluxes were measured using a cavity-enhanced absorption spectroscopy gas analyser (Li 7810, Li-Cor; Lincoln, USA) with two 6 mm diameter 2 m long PTFE tubes, which were extended by 3 m for measuring the upper chambers. Changes in the CH<sub>4</sub> and CO<sub>2</sub> concentrations in the stem chamber were recorded for 4 min at a frequency of 1 Hz. The polypropylene chamber bases were affixed to the bark surface with neutral seal putty, covering an area of 1.40 dm<sup>2</sup> and given an airtight seal using a silicone sealant. The stem chambers had an internal volume of 2.51 dm<sup>3</sup> and were closed by affixing a polypropylene lid lined with a silicone rubber gasket. The slopes of the linear variations in CH<sub>4</sub> concentration in the stem chambers over time were used to calculate CH<sub>4</sub> emissions, which was expressed per unit stem area.

- Species: five species are included in this study, named with the initials of the species binomial Latin name
  - *Cryptomeria japonica*,
  - *Quercus crispula*,
  - *Aesculus turbinata*,
  - *Acer pictum*,
  - *Fraxinus mandshurica*
- Tree: two to five individuals per species, numbered in order of increasing DBH
  - #1, #2, #3, #4 and #5
- DBH\_cm: diameter at breast height in cm
- Position: position of the chamber along the trunk
  - lower (0.5–1.0 m above the soil)
  - intermediate (1.4–1.9 m above the soil)
  - upper (3.0–3.9 m above the soil)
- Height\_cm: height of the chamber from the soil in cm
- Date: date of stem CH<sub>4</sub> flux measurement. Note that when several measurements have been carried out during a given day, the average value is reported (diurnal variations were never significant)
- Tair\_degC: average daily air temperature in °C, recorded every 10 min at a nearby weather station belonging to the Field Science Education and Research Centre of Kyoto University
- API7\_mm: antecedent precipitation index in mm, calculated using the precipitation of the last 7 days recorded every 10 min at a nearby weather station belonging to the Field Science Education and Research Centre of Kyoto University, with a recession coefficient set to a constant value of 0.95
- API30\_mm: antecedent precipitation index in mm, calculated using the precipitation of the last 30 days recorded every 10 min at a nearby weather station belonging to the

Field Science Education and Research Centre of Kyoto University, with a recession coefficient set to a constant value of 0.95

- FCH<sub>4</sub>\_nmolm<sup>-2</sup>s<sup>-1</sup>: Net CH<sub>4</sub> emission in nmol m<sup>-2</sup> s<sup>-1</sup>, calculated using the slope of the linear variation in CH<sub>4</sub> concentration in the stem chambers over time, divided by the stem area covered by the chamber, and accounting for the volume of the chamber, tubing and analyser.

#### File “CH<sub>4</sub>\_prod.csv” (data used in Figures 5, 6,7)

Wood cores were extracted from the trunk with an increment borer (5.15 mm internal diameter) and two segments (4 to 6 cm in length) were cut at both ends of each core, representing the inner heartwood and the outer sapwood, and incubated using a mixture (N<sub>2</sub>, 10% CO<sub>2</sub> and 1% H<sub>2</sub>) at 25 °C in a dark incubator for one week. An air sample (10 µl) was then drawn from each vial through the septum into a syringe and injected through the septum of the small volume sample kit (Li 7800-110) connected to the gas analyser. The sample kit and the analyser were flushed with ambient air before closing the loop. The concentration of CH<sub>4</sub> in the closed loop was recorded 1 min before injection and 2 min after injection, and used to calculate the concentration in the injected air sample. The potential CH<sub>4</sub> production capacity of was calculated by dividing the increase in CH<sub>4</sub> concentration by the duration of the incubation and the dry mass of the wood segment, accounting for the volume of the tube corrected for the volume of the segment.

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  - *Fraxinus mandshurica*
- Tree: two to five individuals per species, numbered in order of increasing DBH
  - #1, #2, #3, #4 and #5
- Position: position where the core was sampled along the trunk
  - lower (0.5–1.0 m above the soil)
  - intermediate (1.4–1.9 m above the soil)
- Tissue: both ends of each core
  - inner heartwood (except the rotten part)
  - outer sapwood
- Density\_gcm<sup>-3</sup>: basic density of the wood segment calculated as the ratio of the dry mass (in g) and the volume of the segment (in cm<sup>3</sup>)
- Moisture\_gg<sup>-1</sup>: moisture content of the wood segment calculated as the difference between the fresh and dry mass of the segment, and divided by its dry mass
- PCH<sub>4</sub>\_nmolg<sup>-1</sup>h<sup>-1</sup>: CH<sub>4</sub> production, in nmol g<sup>-1</sup> h<sup>-1</sup>, calculated using the increase in CH<sub>4</sub> concentration after one week of incubation, divided by the duration of the incubation and the dry mass of the wood segment, accounting for the volume of the vials corrected for the volume of the segment.

- PCH4\_nmolcm-3h-1: CH<sub>4</sub> production, in nmol cm<sup>-3</sup> h<sup>-1</sup>, calculated using the increase in CH<sub>4</sub> concentration after one week of incubation, divided by the duration of the incubation and the volume of the wood segment, accounting for the volume of the vials corrected for the volume of the segment.