Introduction

This document contains estimates that can be used in the box model for all emissions and sinks of species that will be used in the box model, including references. The document is thus subdivided into sections treating each species. We also explain how where we get our data and how we handle it.

Model parameters

Mass atmosphere = 2.767 \*10e18 kg (Lassey et al., 2000)

Global tropospheric temperature = 287.0 (Hansen et al., 2010)

MCF

**Concentrations**

**Emissions**

**Sinks**

Fractionation by OH = -3.9 permil (from Saueressig (2001): it was measured at 296K)

CH4

**Concentrations**

**Emissions**

**Sinks**

Fractionation by OH = -3.9 permil (from Saueressig (2001): it was measured at 296K)

For loss from other processes we use :

, so that:

, with Lother on the left-handside in yr-1 and on the right-hand side in Tg/yr.

This is done so that we can calculate L13other as:

Which is not possible in units of Tg/yr, because then you still have a dependency on the methane concentration included, and obviously [12CH4] is not [13CH4]..

**Data handling**

**Calculating a global average from surface sites.**

1. In Montzka et al. (2011): NOAA data from nine sites, which are aggregated to 3 SH (1 site/box) and 3 NH (2 sites/box) boxes. The boxes are weighted by 0.97/0.76/0.40 (high/mid/low lat) **(WHY?)**, but different weights did not affect the results.
2. In Schaefer et al. (2016)
3. In Maarten’s box model: