

EGU2020-3139

<https://doi.org/10.5194/egusphere-egu2020-3139>

EGU General Assembly 2020

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## A gridded inventory for global CFC-11 emissions from 2008 to 2019

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CFC-11 is a potent ozone depleting gas and is regulated under the Montreal Protocol. The rate of decline in global CFC-11 concentrations has slowed since 2013 largely due to the renewed, increasing emissions from eastern China (Montzka et al, Nature, 2018; Rigby et al, Nature, 2019). However, regional inversions suggest that this increase only accounts for 40-60% of the global rise. Therefore, there is an urgent need for emission estimates in other regions or countries. A global 3D inversion of atmospheric measurements is essential to improve our understanding of CFC-11 emission trends and sources, but it requires a reliable emission inventory as a prior estimate. In this study, we develop a gridded bottom-up inventory of global CFC-11 emissions from 2008 to 2019. Our inventory is driven by various, gridded proxy datasets including population, energy consumption, GDP per capita, and industrial clusters. A machine learning model is built between the proxy data and the previous emission estimates for eastern China, Korea, and Japan derived from inversions of AGAGE and NOAA surface measurements (Rigby et al, Nature, 2019). Our model is cross-validated in the East Asia and then applied to the other regions and countries to construct the gridded inventory with error characterization. Use of our inventory as prior information in future inverse analyses can help better quantify spatial distributions and sources of CFC-11 emissions as well as better guide the regulation of CFC-11.