

## 1.248 Flaring emissions in Africa: distribution, evolution and comparison with current inventories.

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Abstract:

Flaring is a major concern due to large uncertainties in the amount of chemical compounds released into the atmosphere and their evolution with time. A methodology based on DMSP (Defense Meteorological Satellite Program) nighttime light data combined with regional gas flaring volumes from NOAA-NCEI has been developed to estimate flaring emissions. This method is validated in Nigeria where individual field company data are available.

A range of emissions due to flaring is estimated based on emission factors for each species. An average decrease in CO<sub>2</sub> emissions of about 30% is found over Africa from 1995 to 2010, with Nigeria being the largest contributor to this reduction (up to 50%). Changes in the spatial distribution with time indicate local increases, particularly at offshore platforms, which are attributed to a lack of regulations and aging infrastructures in oil/gas fields.

Comparisons with current inventories reveal differences in the location and magnitude of point source emissions. For chemical compounds such as NMVOCs and CH<sub>4</sub>, the ECLIPSE and EDGAR country-level values are considerably higher than the highest estimation in this study for 2005. For species such as CO, OC, BC, SO<sub>2</sub> and NO<sub>x</sub>, the emissions provided by the ECLIPSE and EDGAR inventories are generally within the same order of magnitude as the average values found in this study, with the exception of OC, BC and SO<sub>2</sub> in which EDGAR provides much lower emissions. These discrepancies are likely due to either differences in methodologies used to estimate the emissions, in the values of the emission factors considered, or in the definition of flaring sector. Our current estimations suggest that BC, CH<sub>4</sub> and CO<sub>2</sub> flaring emissions in Africa account for 1-15% (on average 7%), 0.5-8% (on average 2%) and 8-13% (on average 11%) of African total anthropogenic emissions, respectively, with large variability among countries.