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Formaldehyde (HCHO) satellite measurements in shipping emissions.

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We present a case study of the first satellite measurements of formaldehyde (HCHO) from shipping emissions, derived from observations made by the GOME instrument. Launched on the ERS-2 satellite in April 1995, GOME has performed continuous operations over 8 years providing global observations of different trace gases. In this way, satellite observations provide unique opportunities for the identifications of trace gas sources. Previous studies on NO_2 emissions from shipping (Beirle et al., 2004; Richter et al., 2004) and model studies of emissions from international shipping (Eyring et al., 2007) have highlighted the importance of ship exhausts for the marine boundary layer.

We analyzed enhanced HCHO tropospheric columns from shipping emissions over the Indian Ocean between Sri Lanka and Sumatra. This region offers good conditions for plume detection with the GOME instrument as all ship tracks follow a single narrow track in the same east-west direction than used for the GOME pixel scanning. From the observed HCHO column densities we estimate the direct and indirect HCHO emissions from shipping. Comparison with model data shows good agreements with the measured HCHO repartition over the ship track over the studied area.

The results obtained using GOME data are further confirmed by comparison with HCHO columns from SCIAMACHY, which has higher detection limits for formaldehyde but provides better spatial resolution.