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Poster
Airborne and satellite imaging spectrometers such as AVIRIS-NG, GAO, and EMIT are common platforms for the remote sensing of high emission methane events, frequently utilizing column-wise matched filters to detect and quantify emissions. Emission rate quantification from high-resolution methane retrievals often use the Integrated Methane Enhancement (IME) algorithm, which requires explicit spatial delineation of a plume and an estimate of a plume’s length. In complex observing environments, these parameters can be hard to estimate or highly sensitive to noise or retrieval artifacts. In this work, we utilize observations from the Global Airborne Observatory (GAO) of an extensive controlled release experiment to refine a robust sensor independent delineation approach. This algorithm applies multiple image processing steps, each dynamically adjusting enhancement thresholds, to better isolate foreground enhanced CH_4 pixels pertaining to a given plume from background noise pixels. Applying this technique to a large catalog of past airborne campaigns we find increased noise suppression, improved plume delineation, and clearer uncertainty quantification across campaigns and sectors. Adapting this framework to data from the Earth Surface Mineral Dust Source Investigation (EMIT) satellite platform we see similar improvements in noise reduction and plume delineation. With the increasing use of column-wise matched filters across global targets, and the coming launch of multiple satellite imaging spectrometers, this new masking approach is purposely adapted to the diverse observing conditions these platforms present, allowing for robust intercomparisons of global emission estimates from airborne and satellite observations.
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