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Poster
Monitoring and accurately quantifying greenhouse gas (GHG) emissions from point sources via satellite measurements is crucial for validating emission inventories. Numerous studies have utilised varied methods to estimate emission intensities from both natural and anthropogenic point sources, highlighting the potential of satellites for point source quantification. To promote the development of the space-based GHG monitoring system, it is pivotal to assess the satellite's capacity to quantify emissions from distinct sources before its design and launch. However, no universal method currently exists for quantitatively assessing the ability of satellites to quantify point source emissions. This paper presents a parametric conceptual model and database for efficiently evaluating the quantification capabilities of satellites and optimizing their technical characteristics for particular detection missions. Using the model and database, we evaluated how well various satellites can detect and quantify GHG emissions. Our findings indicate that accurate estimation of point source emissions requires both high spatial resolution and measurement precision. The requirement for satellite spatial resolution and measurement precision to achieve unbiased emission estimation gradually decreases with increasing emission intensity. The model and database developed in this study can serve as a reference for harmonious satellite configuration that balances measurement precision and spatial resolution. Furthermore, to progress the evaluation model of satellites for low-intensity emission point sources, it is imperative to implement a more precise simulation model and estimate method with a refined mask-building approach.
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