

Interactive comment on “Plume Propagation Direction Determination with SO₂ Cameras” by Angelika Klein et al.

Anonymous Referee #3

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Plume Propagation Direction Determination with SO₂ Cameras

Klein et al

Review

The paper describes an algorithm which can be used to convert time-evolving 2D imagery from an SO₂-sensitive camera into SO₂ emission rates. The authors apply a full geometric treatment to the sounding problem, and evaluate the errors associated with some commonly used simplifying approximations, including the assumption that emission rate estimates are insensitive to plume direction for a small angular FOV.

Further they note that if emission rate is assumed constant, the actual direction of the plume relative to the viewing direction can also be determined.

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The papers concludes with a demonstration of an application to real data acquired from Mt Etna.

General Comments

I am not familiar with this area of remote sensing but I am a little surprised that independent information on the wind/plume direction is so scarce: no (micro) weather station telemetry, meteorological forecasts, or even a second observing camera viewing the same plume from a different location? All seem simpler alternatives than trying to derive wind direction from the 2D observations from a single site.

A second, perhaps poorly informed, comment is that I assume that there must be some irregularity in the SO₂ emission otherwise it would not be possible to determine (angular) movement of the plume across the camera view. Is this consistent with the assumption of constant emission rate required to determine the plume direction.

Minor Typographical/Gramamtical comments:

- 'degree' is commonly used where 'degrees' is correct.
- 'extension' is commonly used where 'extent' is correct.
- L.146 'alpha' rather than 'apha' (although I would suggest using the symbol instead in $\alpha < 0$ and $\alpha > 0$).
- Fig 3 caption: 'plume extent in x-direction'.
- Captions: 'in dependence of' is perhaps better expressed as 'as a function of', or rephrased along the lines of 'showing the dependence upon' or 'showing the variations with'.