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# *Interactive comment on* "Plume Propagation Direction Determination with SO$_2$ Cameras" *by* Angelika Klein et al.

**Anonymous Referee #2**

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The paper by Klein et al. deals with geometric effects which need to be considered for a correct flux determination of the volcanic plume. The assumption of flux continuity can be used to determine the plume propagation direction and to infer the flux corrected for effects of perspective / projection. I agree to referee #1 that the presentation is somewhat difficult to follow and the suggested corrections would improve clarity. Please explain equation 1 with greater care: what is the meaning of the summation index i? I assume that the summation is performed just along a column of pixels, not over all pixels of the array. Does the equation assume that pixels are quadratic in shape? What is the "diameter" of a quadratic pixel?

I do not understand the discussion of the telecentric projection. The assumption of a telecentric projection might be a useful intermediate step for demonstrating the additional effects of a perspective projection, but the statement " . . . a perspective correction

is more common in SO2 camera . . . setups." remains obscure. For a telecentric projection in object space, you need an optical aperture of the size of the object – I can hardly imagine that any SO2 camera has ever been built that realizes a telecentric projection in object space of a volcanic plume.

You mention the optical flow algorithms by Kern et al.. Advanced methods of flow reconstruction have been developed which use the condition of continuity more explicitly. I think it would be good to cite this approach and to investigate whether such a rigorous physical model (taking into account the projection effects you point out) would allow for the optimum determination of plume parameters. You might refer to the work of Stremme et al., AMT, 2012.

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