Title: The response of ionospheric currents to different types of magnetospheric fast flow bursts using THEMIS observations
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The authors have answered almost all my comments in a satisfactory manner and revised the manuscript accordingly. As the other caes are included in an appendix, there is no need for the table I suggested previously. My only remaining comment, detailed below, is a technical clarification and does not affect the results or conclusions. I have no further comments, and the manuscript can be published with that minor clarification without an additional review round.

Technical comment

I find the description of the relation between the SECS amplitudes and the answer to my previous comment somewhat lacking, or perhaps even misleading to the casual reader. In the SECS analysis of equivalent current from ground magnetic field, like done by Amm+Viljanen (1999) or Weygand et al. (2011), only divergence-free SECS are used. So all the current is in the ionospheric plane, there are no currents perpendicular to ionosphere (field-aligned or vertical). The amplitudes of the divergence-free SECS represent the curl of the horizontal equivalent current, and are not directly associated with any vertical current. In order to get the vertical current from the equivalent current, some assumptions must be made, like explained e.g. in Amm et al (2002):

1) Ionospheric electric field must be a potential field. This is almost always OK.

2) Field-lines must be approximately vertical. This is OK in the auroral regions.

3) Gradients of the Hall and Pedersen conductances must by aligned with the electric field. This may be fine in a statistical sense, or in some very symmetric case like the convection vorted discussed by Amm et al.

4) The ratio of Hall/Pedersen conductance must be spatially constant. This may or may not be the case. If the above assumptions are valid, then FAC = a * (curl of equivalent current), where a is the conductance ratio.

It is of course fair to say that the SECS amplitudes a proxy for the FAC, but in addition to giving the reference to Amm et al. (2002), I suggest that some more details of the required assumptions are given to the readers, who may not be familiar with the topic.