

## Walen Separation in the ionosphere

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Global ionospheric current and convection system couples to the magnetospheric dynamics. Transmission of electromagnetic energy, momentum and current from the magnetosphere to the ionosphere for driving and maintaining the ionospheric current system against to the Joule dissipation should be mediated via shear Alfvén wave. Fundamentally, the above fact won't be changed even for quasi-static state. This means that the ionospheric current and convection system is formed as a result of incident and reflection process of shear Alfvén wave at the ionosphere.

Applying the concept of Walén relation of incompressible MHD disturbances to the ionospheric current and convection system, we develop the methodology that describes the ionospheric current and convection system as a superposition of incident and reflected components of shear Alfvén wave. Extracted incident component corresponds to the driving force of ionospheric current system, while reflected component corresponds to the feedback component to the magnetosphere that is excited as a result of magnetosphere-ionosphere coupling process. The Walén separation also enables to extract the Cowling channel from the ionospheric current and convection system.

In this presentation we will discuss about how the Walén-separation technique can be applied to the realistic ionospheric data and show a specific result of separation analysis.

Keywords: magnetosphere-ionosphere coupling, Walén relation, Alfvén wave, ionospheric current, ionospheric convection