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Steve: The optical signature of subauroral ion drifts

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Little is currently known about the optical phenomenon known as Steve. The first scientific publication on the subject suggests that Steve is associated with an intense subauroral ion drift (SAID). However, additional inquiry is warranted as this suggested relationship as it is based on a single case study. Here we present eight occurrences of Steve with coincident or near-coincident measurements from the European Space Agency's Swarm satellites and show that Steve is consistently associated with SAID. When satellite observations coincident with Steve are compared to that of typical SAID, we find the SAID associated with Steve to have above average peak ion velocities and electron temperatures, as well as extremely low plasma densities.

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