

Do Ionospheric Storms Have Common TEC Variation Features?

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TEC measurements from the GPS network make it possible to compare ionospheric storm features on global scales. The storm features observed previously from individual locations can be organically linked together with such measurements. Even though every ionospheric storm has a different face due to various competing factors, we have tried to classify the storms by finding similar TEC variation patterns, based on high resolution global ionospheric TEC maps. We have studied more than ten of the strongest storm events of the last four years. During the solar declining phase, northern hemispheric storms usually show a strong effect on ionospheric TEC enhancements. While the southern ionosphere shows a clear negative phase, the northern hemisphere often exhibits a weak negative phase or none at all. The first ionospheric signature usually appears at auroral/subauroral latitudes one or two hours after storm starts. For these storms, three TEC features are common: auroral/subauroral enhancements at night; middle latitude enhancements around noon occurring a few hours later (caused by the neutral wind or a TID); high latitude depletions at the recovery phase (due to thermospheric circulation and composition changes). In addition, other features are also frequently seen such as: conjugated enhancements; low latitude or equatorial enhancements (dayside) and depressions (nightside) caused by the magnetospheric electric field penetration after the IMF southward turning; and latitudinal structures (enhancements then depressions).

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