



## **Effects of Solar Eclipses over the EISCAT ISR radars**

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The 10 June 2021 annular solar eclipse occurred close to the local noons at both the EISCAT Svalbard and EISCAT mainland incoherent scatter radars. The lunar shadow reached its maximum in the ionospheric topside of both radars. The radars operated for three days around the eclipse, and geomagnetically the previous and the eclipse day were very quiet and make a good comparison on the effects of the shadow region passing the radar beams.

The observations shows rather dramatic effects at the Svalbard radar, with a large reduction of electron temperature of about 1000 K for all F region heights. With the moving shadow, enhanced ion eastward drifts of 1000 m/s emerged. At the mainland the eclipse was less intense, and the effects was relatively less intense with decreases of electron density at both the topside as in the E-region.

The EISCAT radars have been operated for several solar eclipses over the recent 25 years with at least 90% of the sun covered by the moon at some altitude, and the ionospheric effects of them are studied with respect to background activity and ionospheric region. For many of them it's mainly the first order effects, like the F-region electron temperature and the E-region densities, that can be identified mainly due to the magnetic activities at these high latitudes. This makes quiet levels of the 2021 eclipse even more valuable as it allows investigation of the following orders of effects. With these consideration, the measurements are discussed and quantitative results will be presented.