Consorzio Interuniversitario per la Fisica Spaziale



GG

OF Space Science

HOW THE MIDLATITUDE IONOSPHERE RESPONDS TO GEOMAGNETIC STORMS IN WINTER FROM

2012 TO 2015

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# GGI

### SOURCE OF DATA

2. Study Phase

1. Study Phase: VISRC-2 Ionosonde, Széchenyi István Geophysical Observatory (NCK)





![](_page_2_Picture_0.jpeg)

1. What is the response of the midlatitude ionospheric F2-layer to geomagnetic storms?

2. How an ionospheric storm propagates over a North-South geomagnetic meridian?

3. How the occurrence of TIDs (Travelling Ionospheric Disturbances) and Spread-F phenomenas depend on the magnitude of geomagnetic activity?

4. How the daily number of TID occurences correlate to the appearance of Spread-F?

### 1. RESULT: EFFECTS OF THE GEOMAGNETIC STORM TO THE IONOSPHERE

![](_page_3_Figure_1.jpeg)

Time (UTC)

![](_page_3_Figure_2.jpeg)

### 2. RESULT:

#### 2013

![](_page_4_Figure_2.jpeg)

#### 2015

#### 2015. March 16-25

![](_page_4_Figure_5.jpeg)

#### 2013. March 16-23

# THANK YOU!

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Source: https://upload.wikimedia.org/wikipedia/commons/f/f3/Magnetosphere\_rendition.jpg

## 3. RESULTS:

### THE DEPENDENCE OF THE OCCURENCE OF TID FROM GLOBAL DST-, AE-INDICIES

Here we can see, how the occurence of *TID*s depend on the magnitude of the *geomagnetic storm* 

The *magnitude of the geomagnetic storm* increase with:

- the decrease of the *Dst- index*, and
- the increase of the *Ae-index*.

34 32 32 30 30 28 28 26 26 24 24 S 22 **DH** 22 Ĩ 20 20 18 of of 18 16 umber Number 14 12 12 Fit Results Fit Results 10 Fit 2: Linear 10 Fit 2: Linear Equation Y = -0.0444256589 \* X + 21.9648057 Equation Y = 0.005062249687 \* X + 21.08092946 Ζ Number of data points used = 14 Number of data points used = 14 Average X = -69.9286 Average X = 788.286 Average Y = 25.0714 Average Y = 25.0714 Residual sum of squares = 90.6761 Residual sum of squares = 83.5236 Regression sum of squares = 146.252 Regression sum of squares = 153,405 Coef of determination, R-squared = 0.617285 Coef of determination. R-squared = 0.647473 Residual mean square, sigma-hat-sq'd = 7.55634 Residual mean square, sigma-hat-sg/d = 6.9603 0 -200 -230 1200 1500 1800 2100 2400 Dst-index(nT) Ae-index

TID occurrence in the function of Dst- and Ae- indicies