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# Russian Geomagnetic Recordings in the 19th Century compared to Modern Observations

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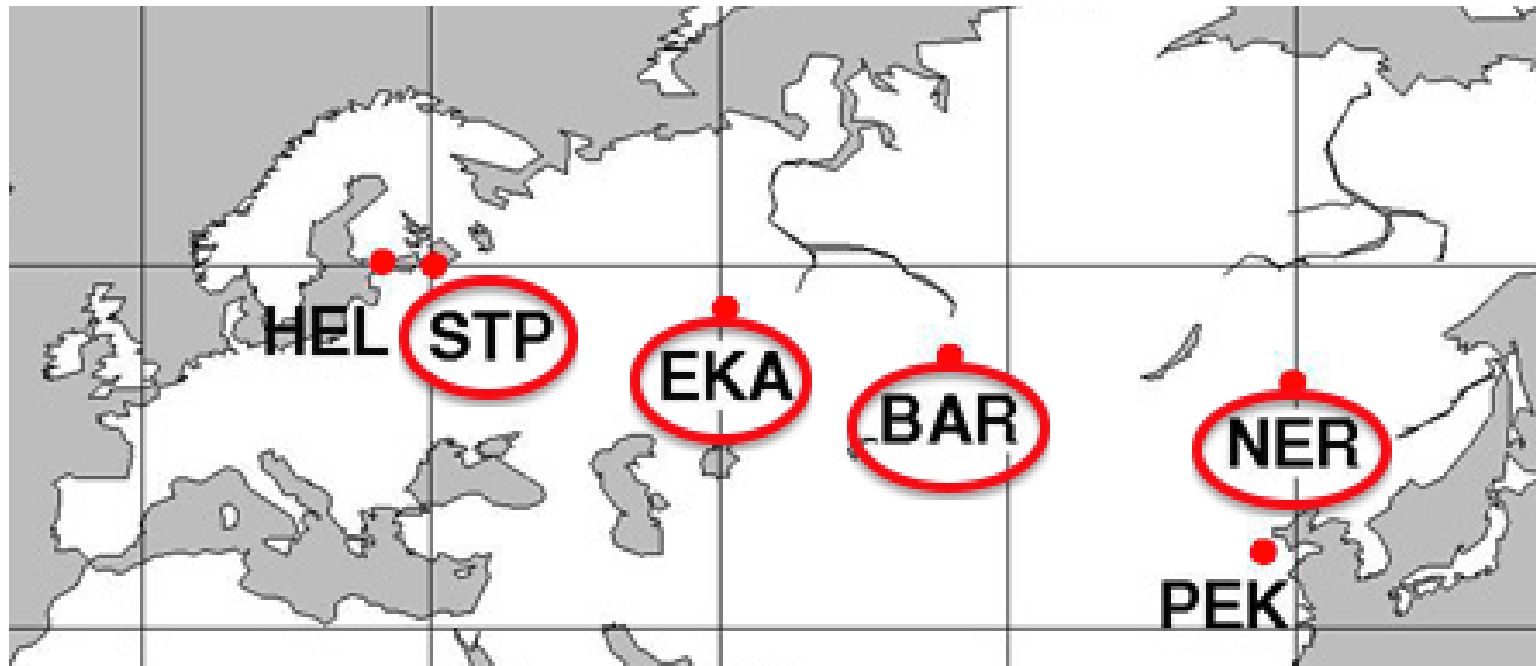


<http://www.eurisgic.eu/>

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## Recordings in Russia in 1850-1862



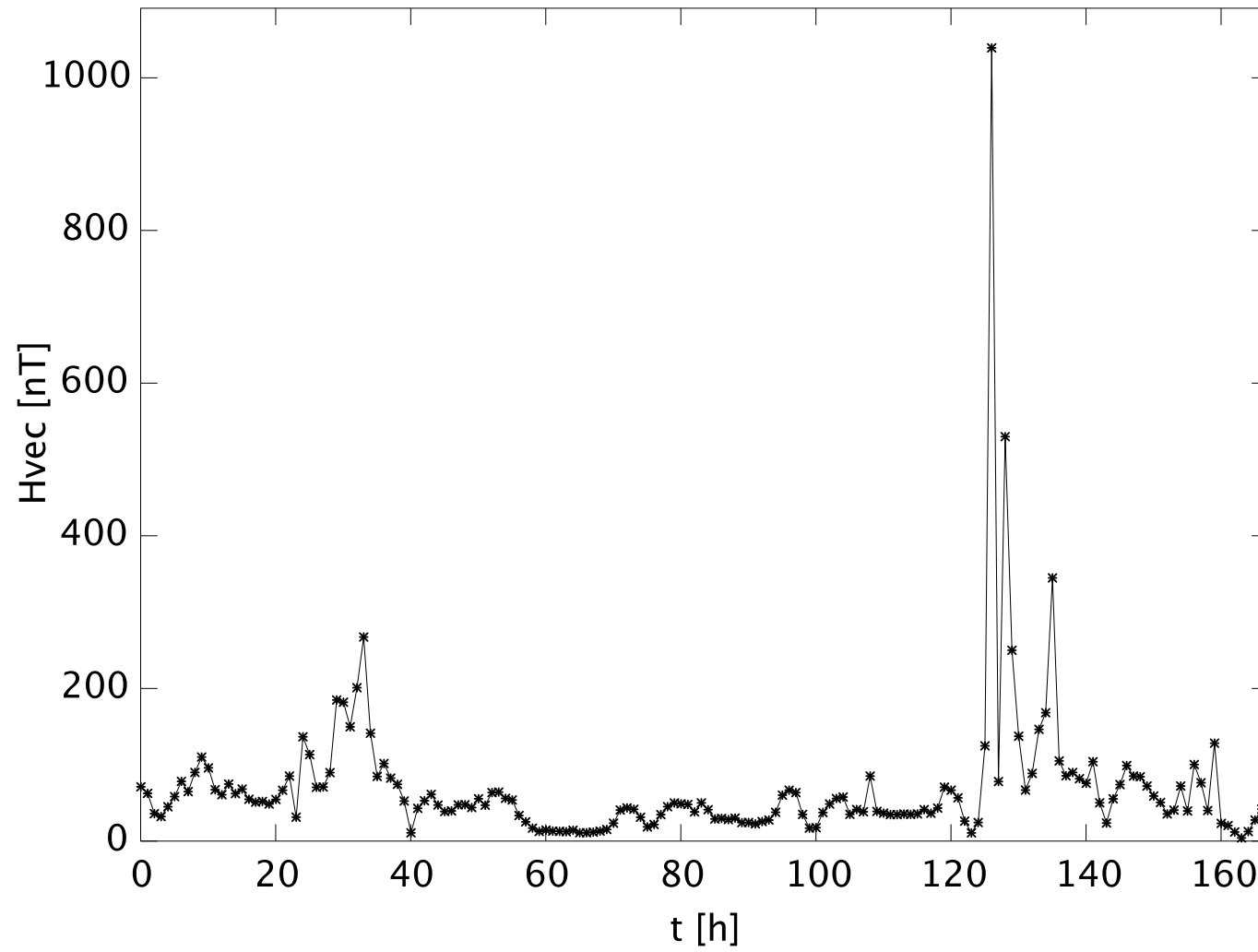
One reading per hour: mean value of five observations at 15 s intervals  
Converted to the magnetic north ( $H$ ) and east ( $D$ ) components in nT  
Off-scale limit: about 1000 nT

NER: perfect coverage during the Carrington storm

Modern reference stations: Nurmijärvi (FI) and Tartu (EE) close to STP



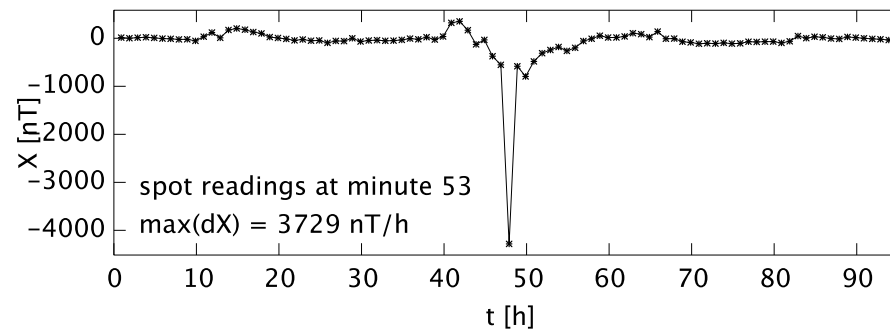
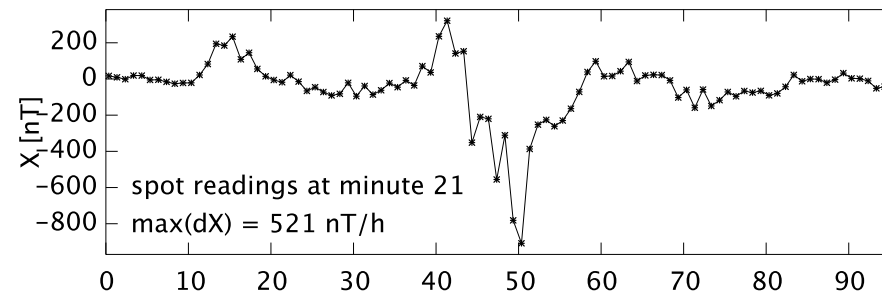
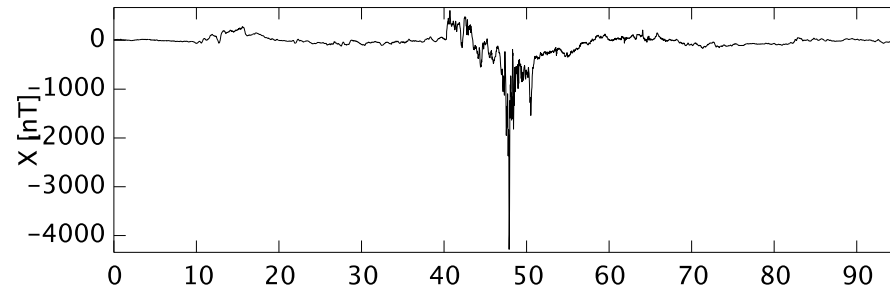
## $|H|$ at Nertchinsk (CGM lat 45 N), 28 Aug - 3 Sep 1859





## Reduction of modern data to the old format

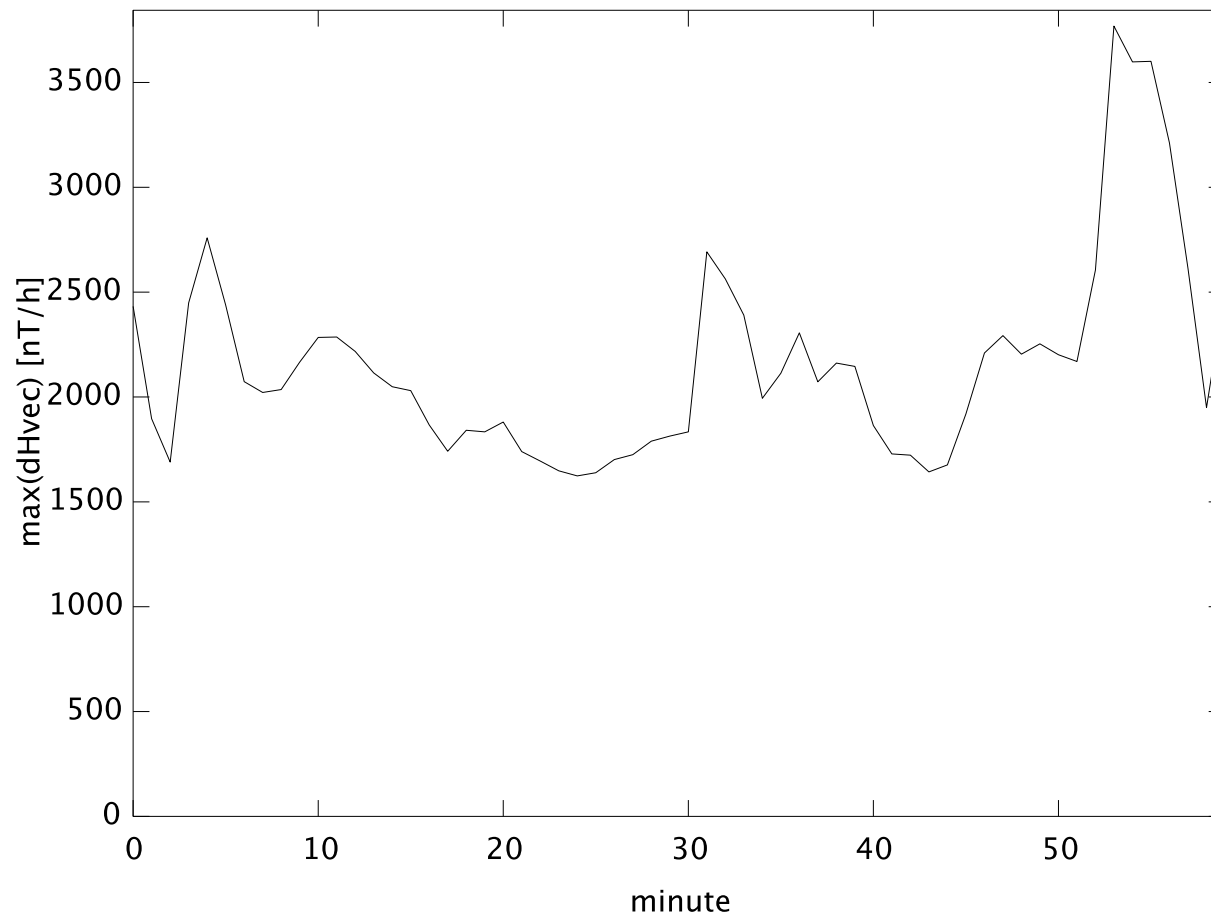
NUR 19820712 - 19820715

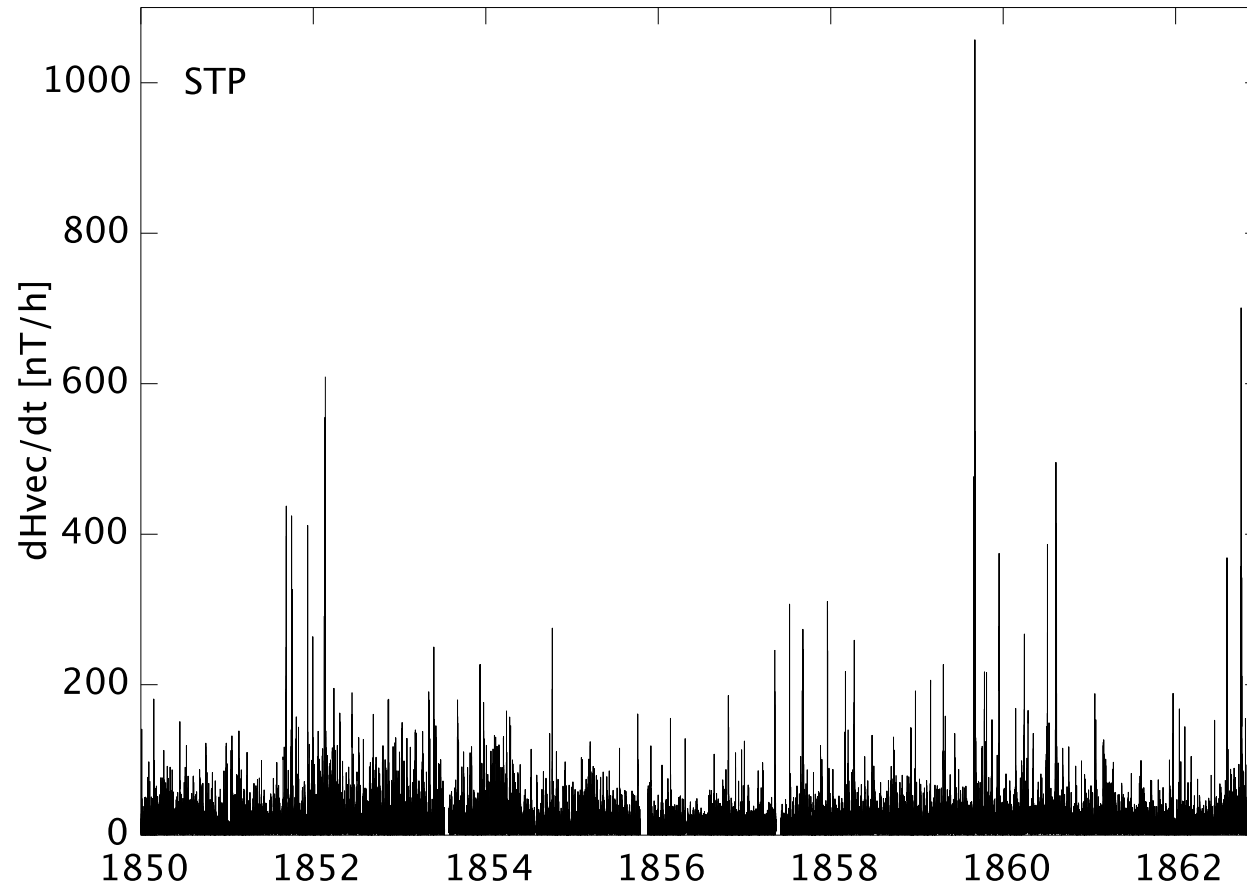




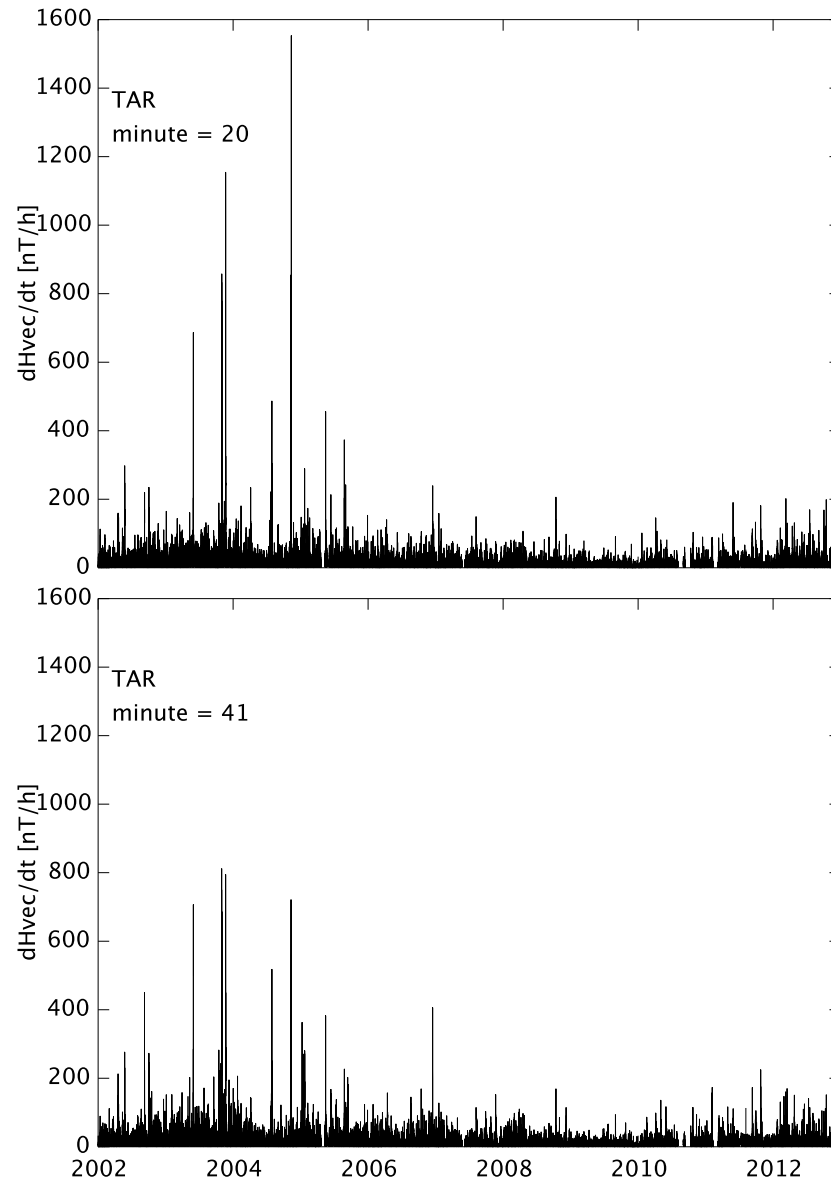
Depending on the selected minute for the spot reading, the maximum hourly change in **H** varies by a factor of two.

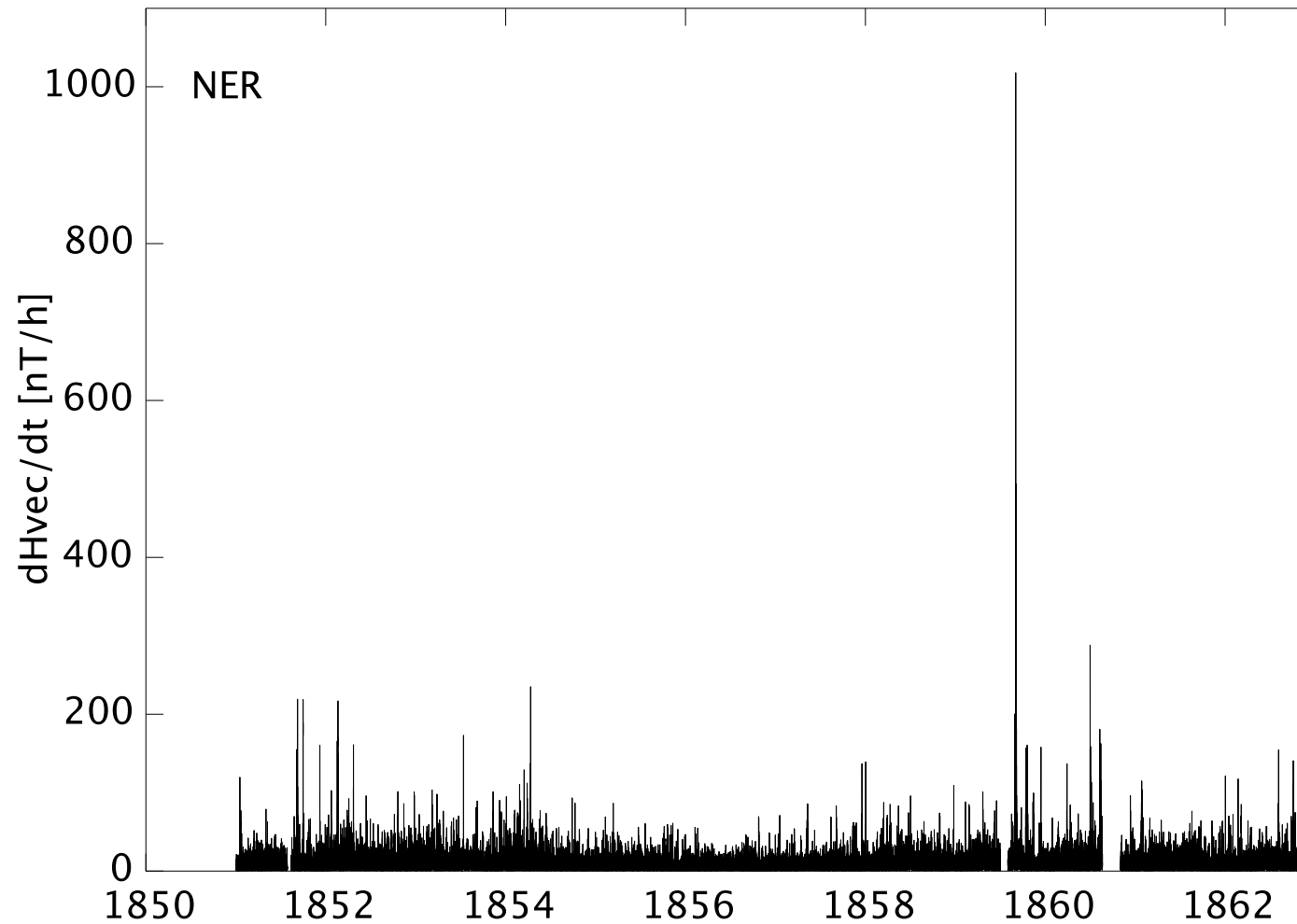
NUR 19750101 - 20121231





Maximum hourly change in  $\mathbf{H}$  at St. Petersburg  
Compare to Tartu (Estonia), with approximately the same CGM latitude  
in 2000 as at STP in 1850.





At Nertchinsk, the Carrington event is at least four times larger than any other storm in 1851-1862.





## Conclusions

St. Petersburg (1850-1862): Carrington does not seem to be an extraordinary event. However, there were obviously off-scale values.

Tartu (2002-2012): (Slightly) more active than STP.

Nurmijärvi (1975-2012): Much more active than STP.

Nertchinsk (1851-1862): Carrington was at least at the same level as Halloween at Tartu (10 deg more northward).

**Carrington was definitely a huge event at mid-latitudes ( $\sim 45$  N)**

**Did it exceed the modern storms at higher latitudes ( $> 55$  N)?**

**For example, was the July 1982 event larger there than Carrington?**



## References

*Nevanlinna, H. and L. Häkkinen*, 2010: Results of Russian geomagnetic observatories in the 19th century: magnetic activity, 1841-1862. *Ann. Geophys.*, **28**, 917-926, doi:10.5194/angeo-28-917-2010.

Data available at:

[http://space.fmi.fi/MAGN/russia\\_1800/](http://space.fmi.fi/MAGN/russia_1800/)