



Geomagnetic forecast tool

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General description

- Purpose: short-time forecast of geomagnetic indices
- Scope: general purpose
- Typical usage: assessment of the overall space weather conditions, input for other models
- Targeted user groups: satellite operators, researchers, generally interested people





Current status

- 1-4 hour Dst forecast is available online at DLR (pre-operational testing phase):
<http://swaciwebdevelop.dlr.de/geomagnetic-indices/dst-index/>.
- 3 hour **official** Kp and ap forecasts pending integration.
- Additional features will be available at a later stage of development.

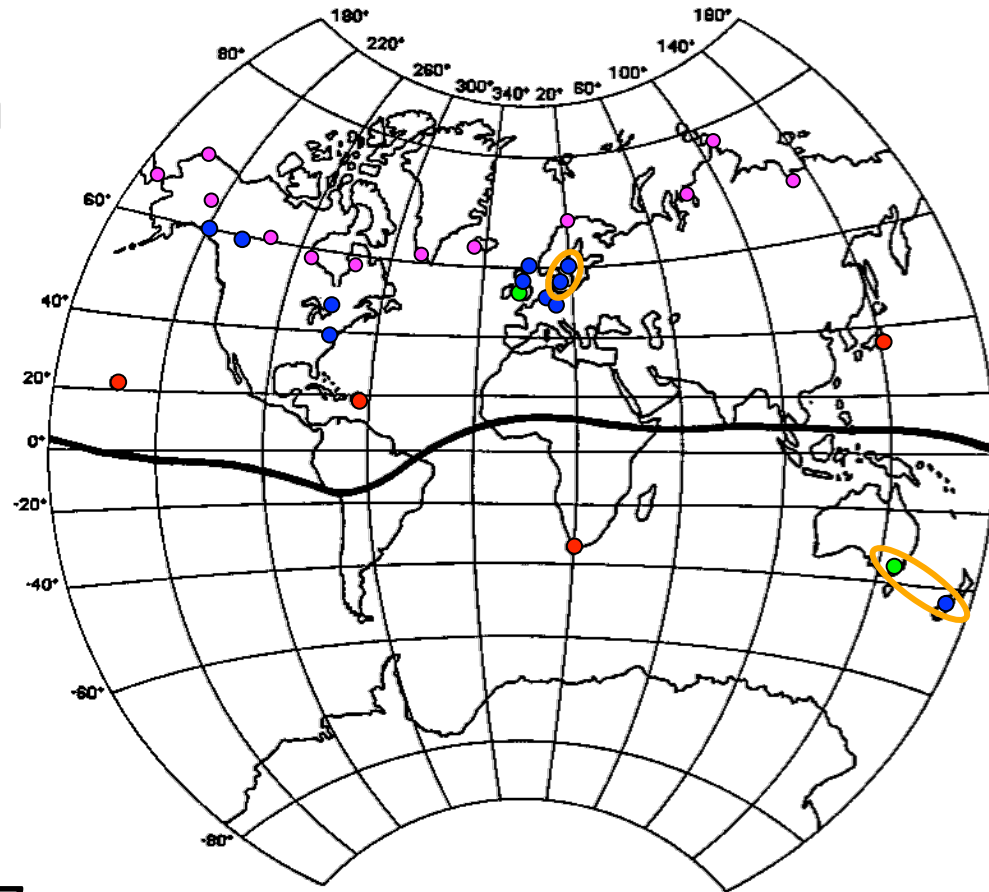




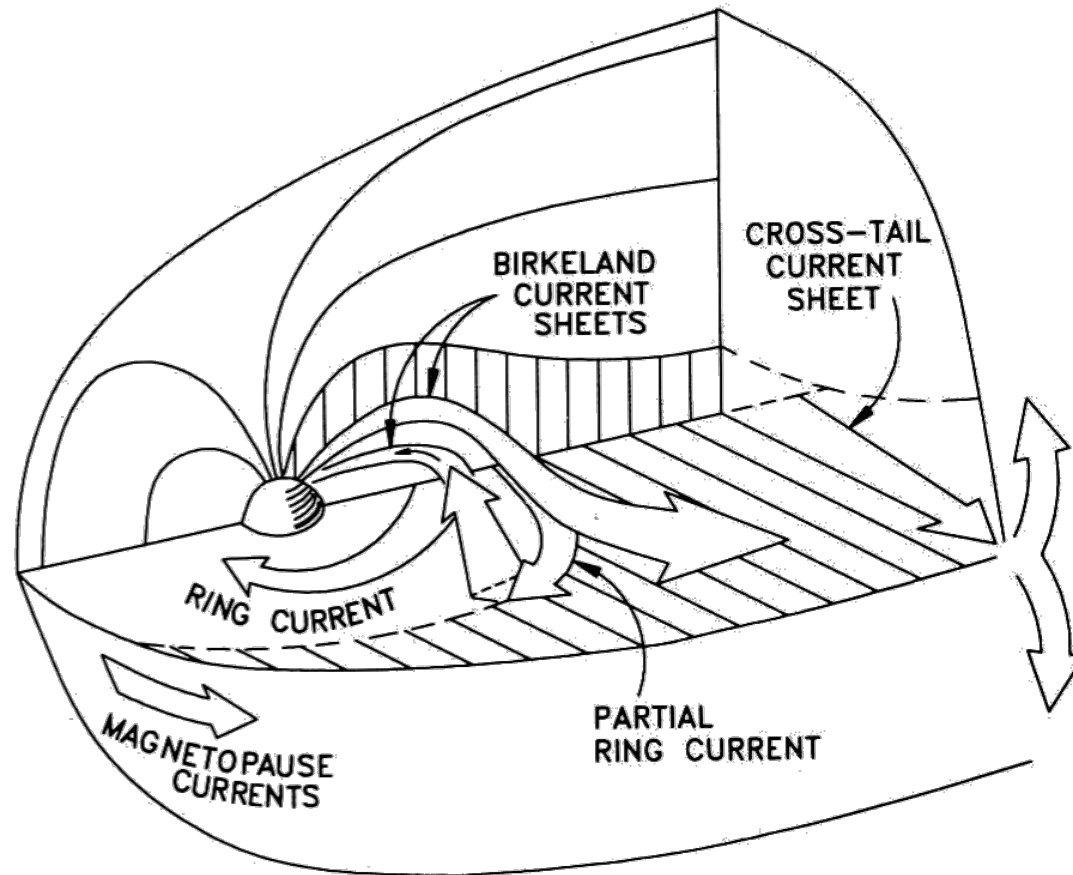
Geomagnetic indices

Geomagnetic indices are mean variations at selected IMO's:

- aa (2), 1896
- K_p (11+2), 1928, marked stations are averaged
- D_{ST} (4), 1957
- AE etc. (12), 1957



The magnetosphere



... as perceived by scientists



The magnetosphere



... as perceived by forecasters





Input files

- Hourly ACE/MAG
- Hourly ACE/SWEPAM
- Quicklook Dst from WDC-C2 Kyoto
- Quicklook Kp from GFZ Potsdam (also contains ap and SSN)





Output files

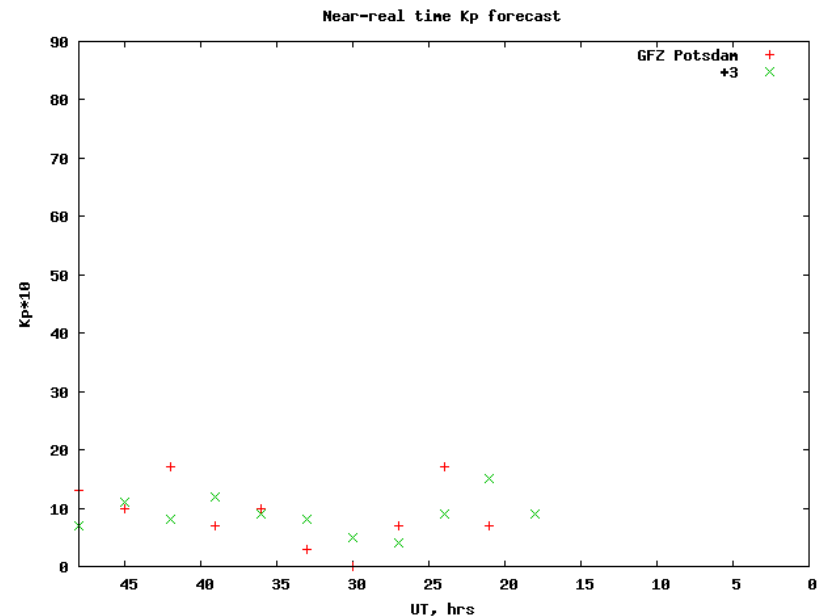
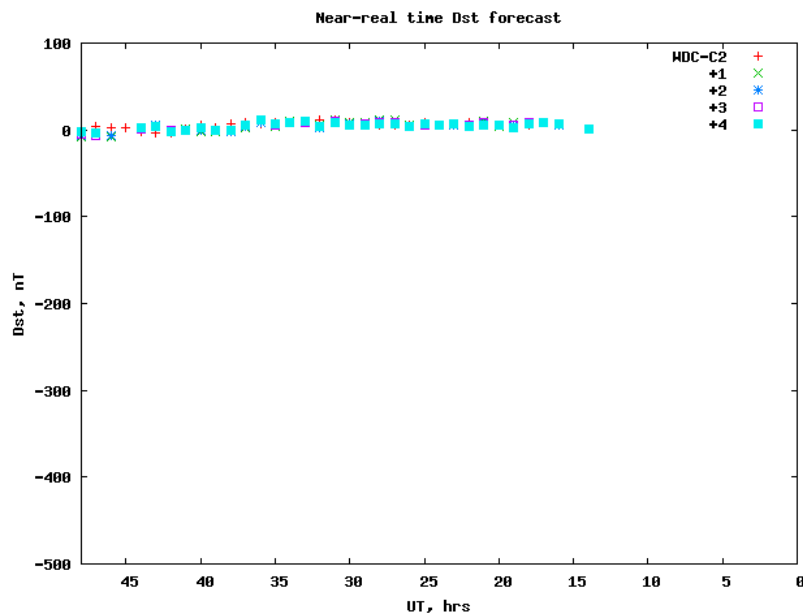
- Forecast in plain text format
- Metadata in XML format
- Real-time plots using third party software





Example of the output

HOY	HTND	YYYY	MM	DD	DOY	HH	Dst [nT]	FC+01H [nT]	FC+02H [nT]	FC+03H [nT]	FC+04H [nT]
1393	24	2013	2	28	59	0	5.	5.	5.	5.	6.
1394	23	2013	2	28	59	1	7.	6.	6.	7.	7.
1395	22	2013	2	28	59	2	8.	6.	5.	5.	4.
1396	21	2013	2	28	59	3	8.	10.	9.	8.	6.
1397	20	2013	2	28	59	4	6.	4.	5.	5.	5.
1398	19	2013	2	28	59	5	6.	8.	6.	5.	3.
1399	18	2013	2	28	59	6	5.	9.	9.	8.	7.
1400	17	2013	2	28	59	7	5.	8.	8.	8.	8.
1401	16	2013	2	28	59	8	9999.	6.	6.	7.	7.
1402	15	2013	2	28	59	9	9999.	9999.	9999.	9999.	9999.
1403	14	2013	2	28	59	10	9999.	9999.	9999.	9999.	0.





Metadata

- XML format
- Contains basic info about the forecast:
 - generation time, revision, start/stop time,
 - a brief description, contact info, etc.
- Performance info:
 - mean square error
 - prediction efficiency
 - correlation with the actual index
 - skill score





Usage

- Run 2 programs every hour
 - Archive/visualize the output
 - That's it
-
- You can supply your own NRT data.

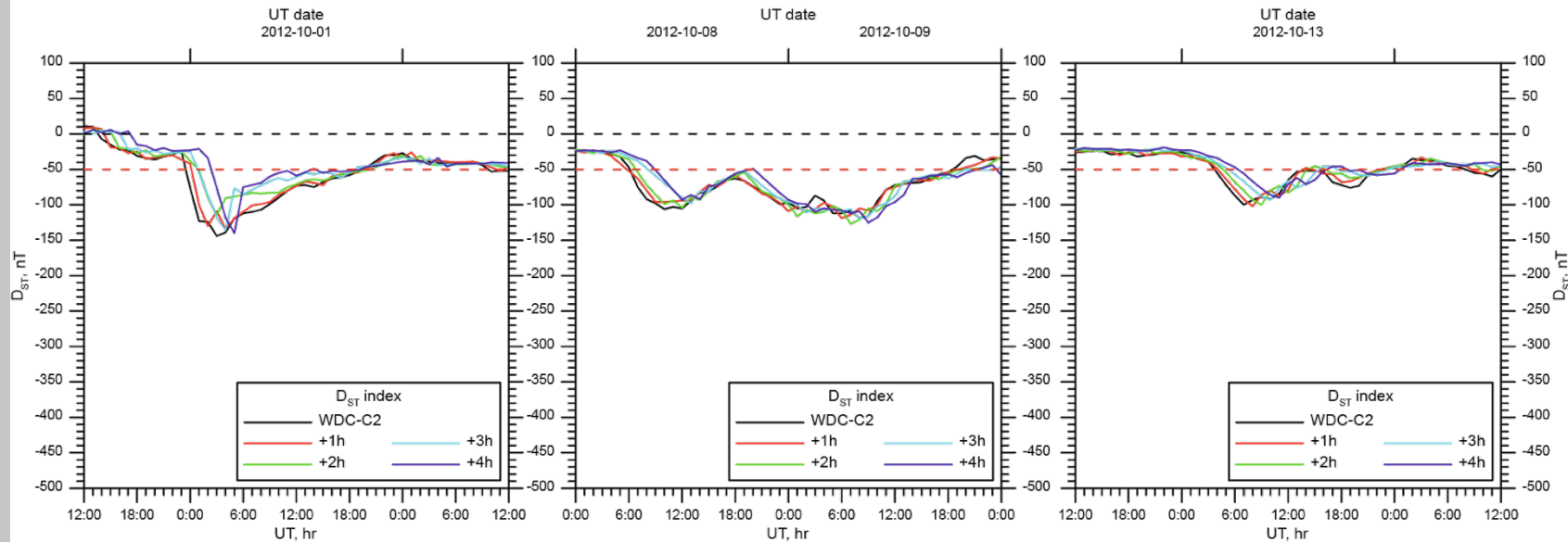




Some examples (D_{ST} , Oct 2012)

Performance stats of near-real time D_{ST} forecast, 2012-09-28T04:00:00Z to 2012-10-27T06:00:00Z

Lead time, h	1		2		3		4	
Model type	Forecast Persistence		Forecast Persistence		Forecast Persistence		Forecast Persistence	
MSE, nT	3.9	5.1	6.6	8.8	7.4	12	11	14
PE, %	97.6	96.0	93.3	88.2	91.7	79.7	82.6	70.8
r, %	93.1	98.0	89.8	94.1	86.0	89.9	84.4	85.5
Skill score, %	41.1		43.4		59.2		40.3	



NB: The plots are produced by a third-party software. The module doesn't have visualization capabilities and provides ASCII output and XML metadata.



Our offer

- We can tailor this product to suit your specific requirements:
 - different input/output format
 - different host platform
 - different cadence
 - derived products
- Please tell us what you would like this product to be.
- Forecast of other values can be discussed.





Contact information

- All inquiries should be addressed to Aleksei Parnowski (parnowski@ikd.kiev.ua).
- Please visit our stand in the afternoon for a live demo.
- You can find the user manual in the folder.
- You can also give your contact info at the stand to receive email updates about the product.





Thank you! Questions?



Acknowledgement

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