

Supplement of Ann. Geophys., 33, 505–517, 2015
<http://www.ann-geophys.net/33/505/2015/>
doi:10.5194/angeo-33-505-2015-supplement
© Author(s) 2015. CC Attribution 3.0 License.



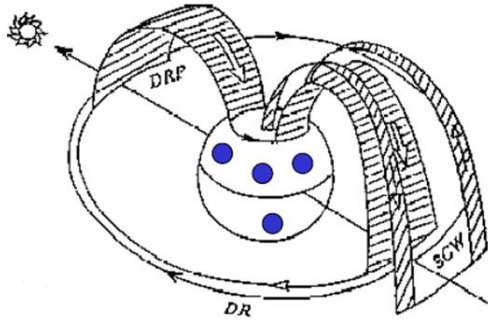
Supplement of

A quantitative study of magnetospheric magnetic field line deformation by a two-loop substorm current wedge

A. V. Nikolaev et al.

Correspondence to: A. V. Nikolaev (demosfen.spb@gmail.com)

Interpretational model [Sergeev et al., 1996]



Input magnetic data:

$\Delta X, \Delta Y$ – magnetic components observed by INTERMAGNET and THEMIS ground-based stations [nT].

Free parameters (output):

Pw, Pe – SCW FAC longitudes [SMLon];

Pn, W – DRP FAC longitudes [SMLon];

$I_{SCW} (I_1)$ – SCW (R1 loop) current intensity [MA];

$I_{DRP} (I_3)$ – DRP current intensity [MA];

$I_{DR} (I_4)$ – DR current intensity [MA].

Fixed parameters:

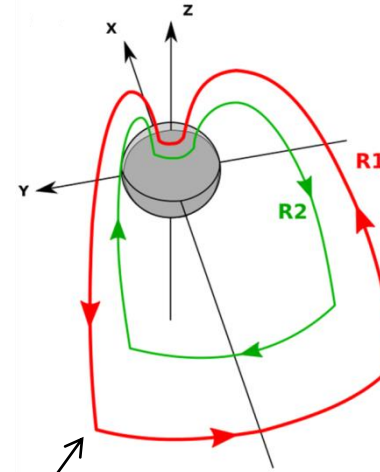
$R_{DR} = 4$ (Ring Current radius) [Re];

$RT_1 = 6$ (Distance to SCW equatorial current) [Re];

$RT_3 = 6$ (Distance to DRP equatorial current) [Re];

$A_{ej} = 66^\circ$ (Auroral electrojet latitude) [Glat].

SCW2L model [Sergeev et al., 2011]



Input magnetic data:

$\Delta X_{CORR}, \Delta Y_{CORR}$ – corrected magnetic components observed by INTERMAGNET and THEMIS ground-based stations:

$$\Delta X_{CORR} = \Delta X / K_{IND}$$

$$\Delta Y_{CORR} = \Delta Y / K_{IND}$$

($K_{IND} = 1.6 - \Delta X$ and ΔY correction coefficient due to induction currents);

ΔBz – magnetic components [GSM] observed by spacecraft (GOES/THEMIS etc.);

$DD \sim R^{3/2}$ – filamentary current transverse spread [Re]

Fixed parameters (input)

Pw, Pe – SCW FAC longitudes (obtained from interpretational model);

Pn, W – DRP FAC longitudes (obtained from interpretational model);

$R_{DR} = 4$ (Ring Current radius) [Re];

$RT_1 = 15$ (Distance to SCW equatorial current) [Re];

$RT_3 = 13$ (Distance to DRP equatorial current) [Re];

Free parameters (output):

I_1 and I_2 – R1 and R2 loop current intensities [MA];

I_3 – DRP current intensity [MA];

I_4 – DR current intensity [MA];

RT_2 – distance to R2 equatorial current [Re];

RCF – magnitude of the background magnetic field (calculated once prior to onset);