

Opšta cirkulacija atmosfere

Seminarski rad

Operativna identifikacija, prognozljivost
bloking situacija i uticaj na ekstremne
padavine u Srbiji

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Bloking index Tibaldi & Monteni (1990)

- Jednačine kojima se definišu južni i severni gradijent geopotencijala na 500 mb geopotencijalnoj površini

$$GHGS = \left[\frac{Z(\phi_o) - Z(\phi_s)}{\phi_o - \phi_s} \right]$$

$$GHGN = \left[\frac{Z(\phi_n) - Z(\phi_o)}{\phi_n - \phi_o} \right]$$

$$\phi_n = 80^\circ N + \delta, \phi_o = 60^\circ N + \delta, \phi_s = 40^\circ N + \delta, \delta = -5^\circ, 0^\circ, 5^\circ.$$

GHGS – “severni” gradijent geopotencijala

GHGS – “južni” gradijent geopotencijala

Neophodan uslov

- Idući u meridionalnom pravcu od centralne širine ka ekvatoru, geopotencijal treba da opada, što je ekvivalentno zahtevu da na centralnoj širini Φ_0 bude toplije (na 500mb) nego južnije Φ_S

$$GHGS \geq 0$$

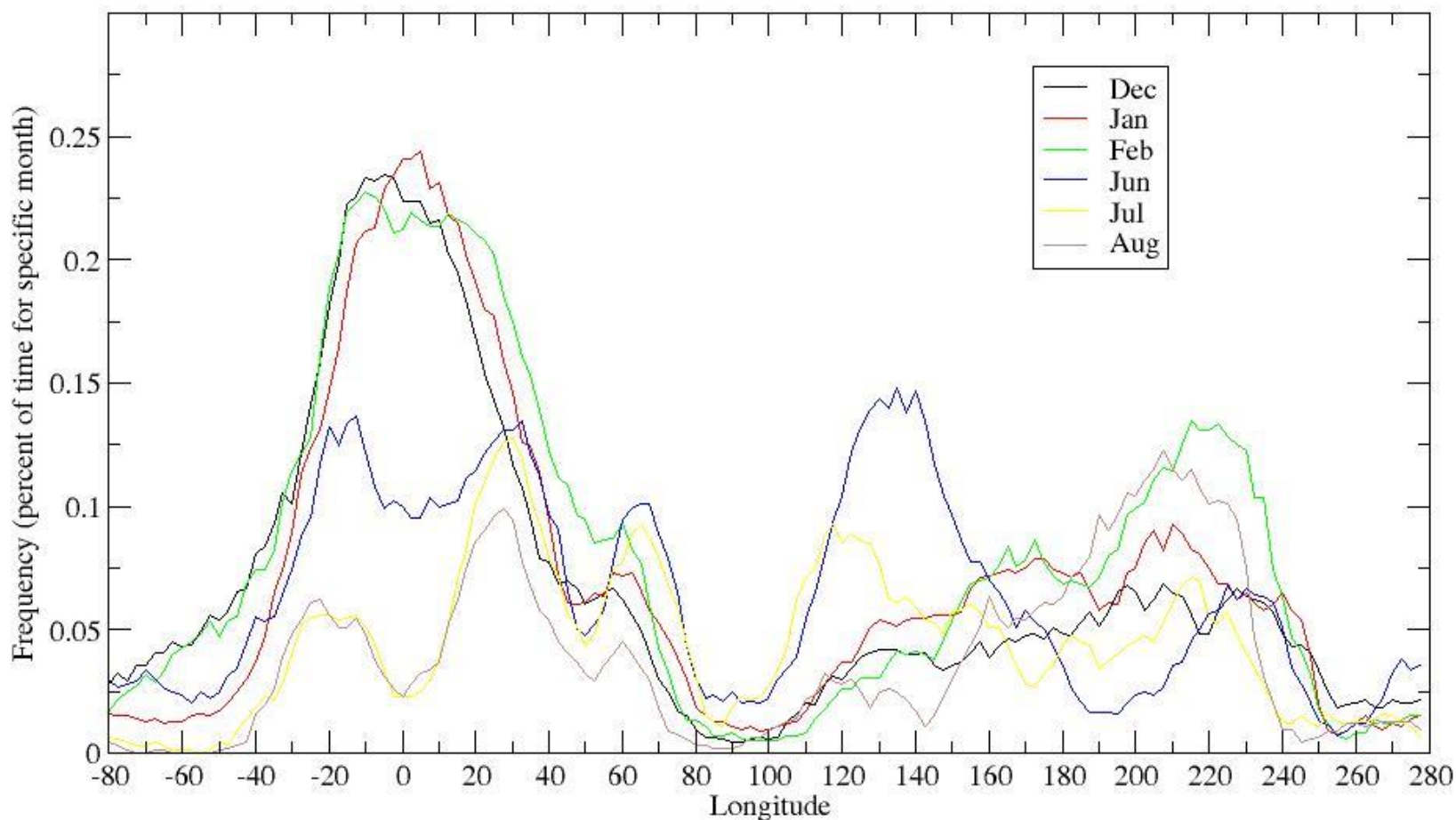
- Razlika geopotencijala između južne i severne širine treba da bude veća od 40 geopotencijalnih dekametara, što je ekvivalentno zahtevu da vrednost geopotencijala opada u meridionalnom pravcu za 10 geopotencijalnih metara na svaki stepen širine

$$GHGN < -10$$

- Blokiranje je znatnije izraženo u toku zime nego u toku leta
- U toku zimskih meseci je zadovoljen uslov da su vremenske razmere procesa reda veličine nedelju dana (frekvenca ~ 0.25 znači da se približno četvrtinu dana u mesecu javljaju blokirajuće situacije)

Klimatologija bloking indeksa

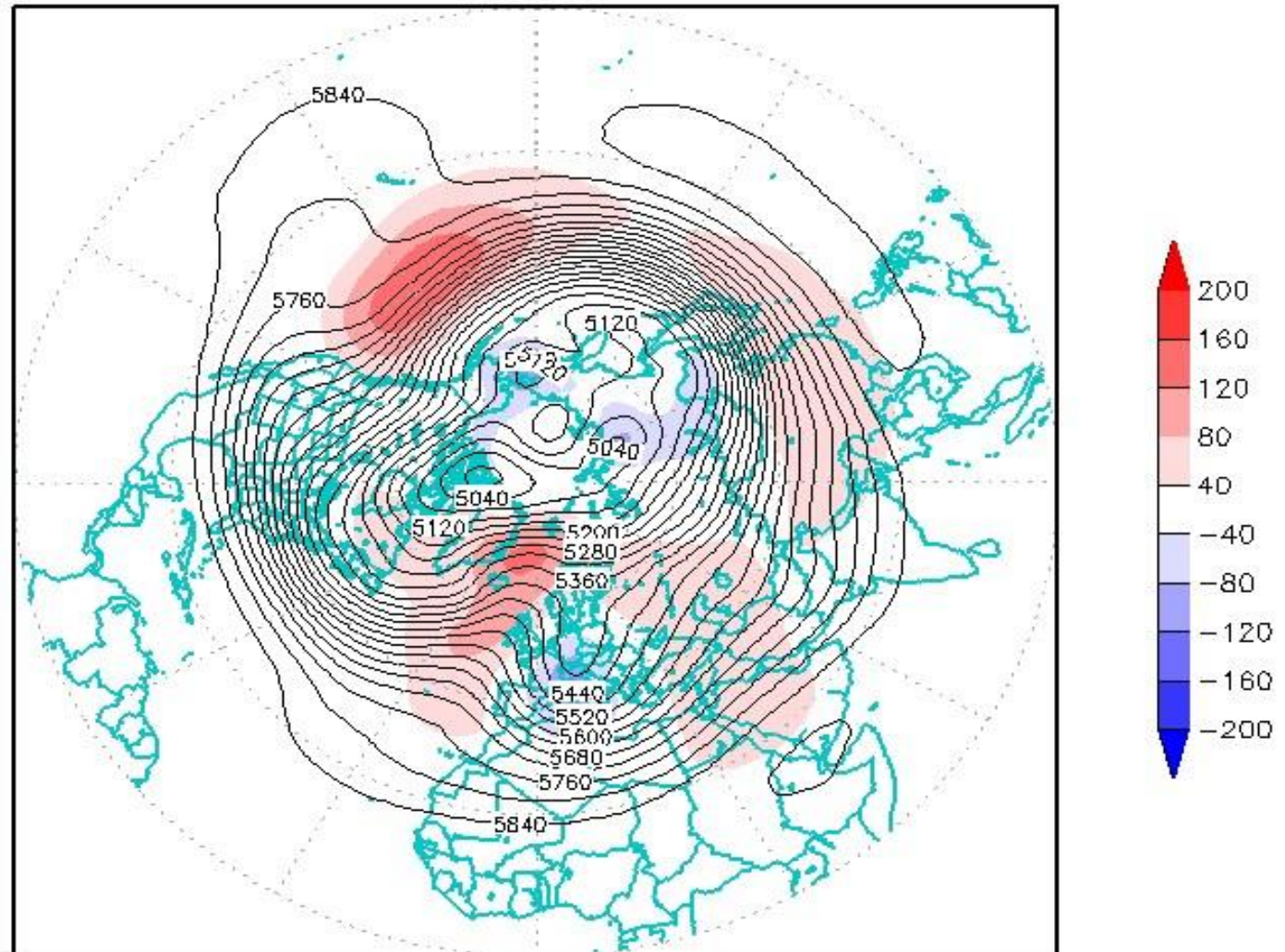
Monthly frequency (clim 1981-2010)



Podaci koji su korišćeni za računanje bloking indeksa: NCEP reanalize, horizontalno razlaganje 2.5°

Bloking u Atlantiku, februar 2013. godine

Feb2013 AT500 hgt and anomaly 61–90

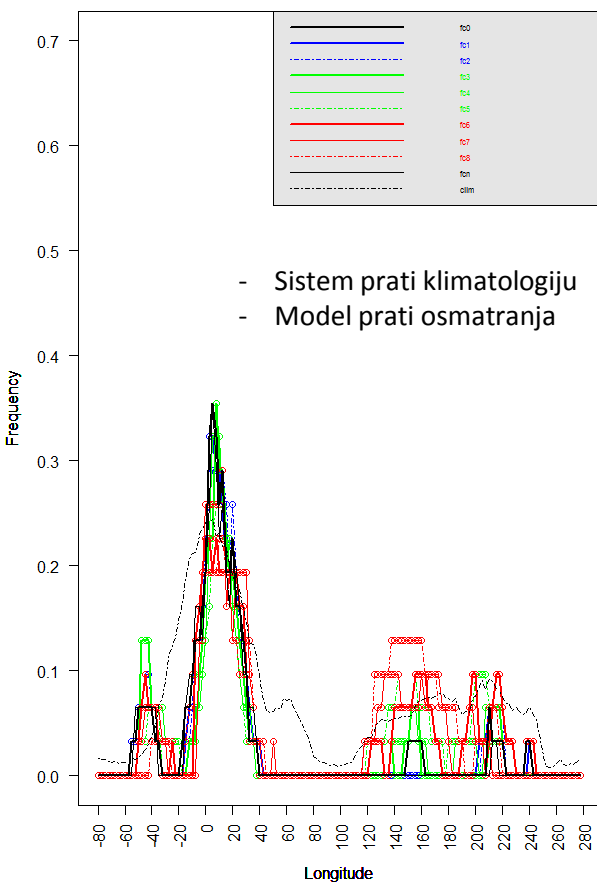


	NAO	EA	WP	EP/NP	PNA	EA/WR	SCA	TNH	POL	PT	Expl. Var.
81–10:	-0.96	0.14	1.49	-0.88	0.30	-1.28	1.00	0.87	0.34	99.90	75.5

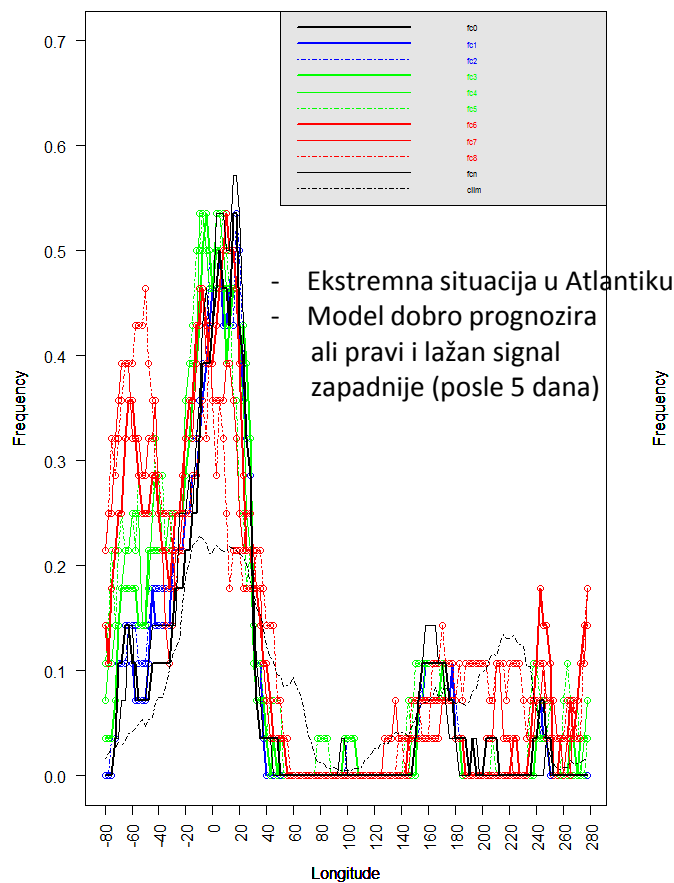
Prognoza bloking indeksa NMMB globalnim modelom

Monthly overview of blocking frequency

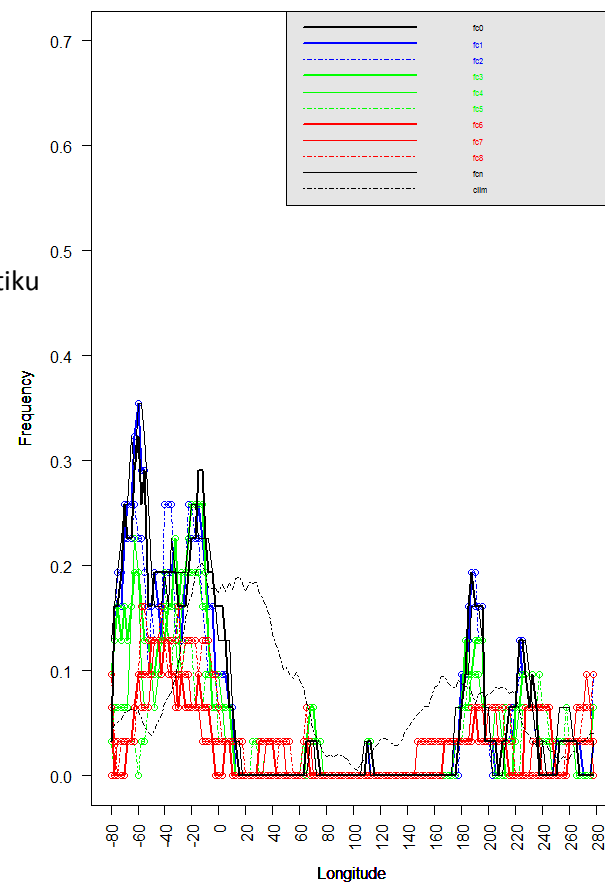
January 2013



February 2013



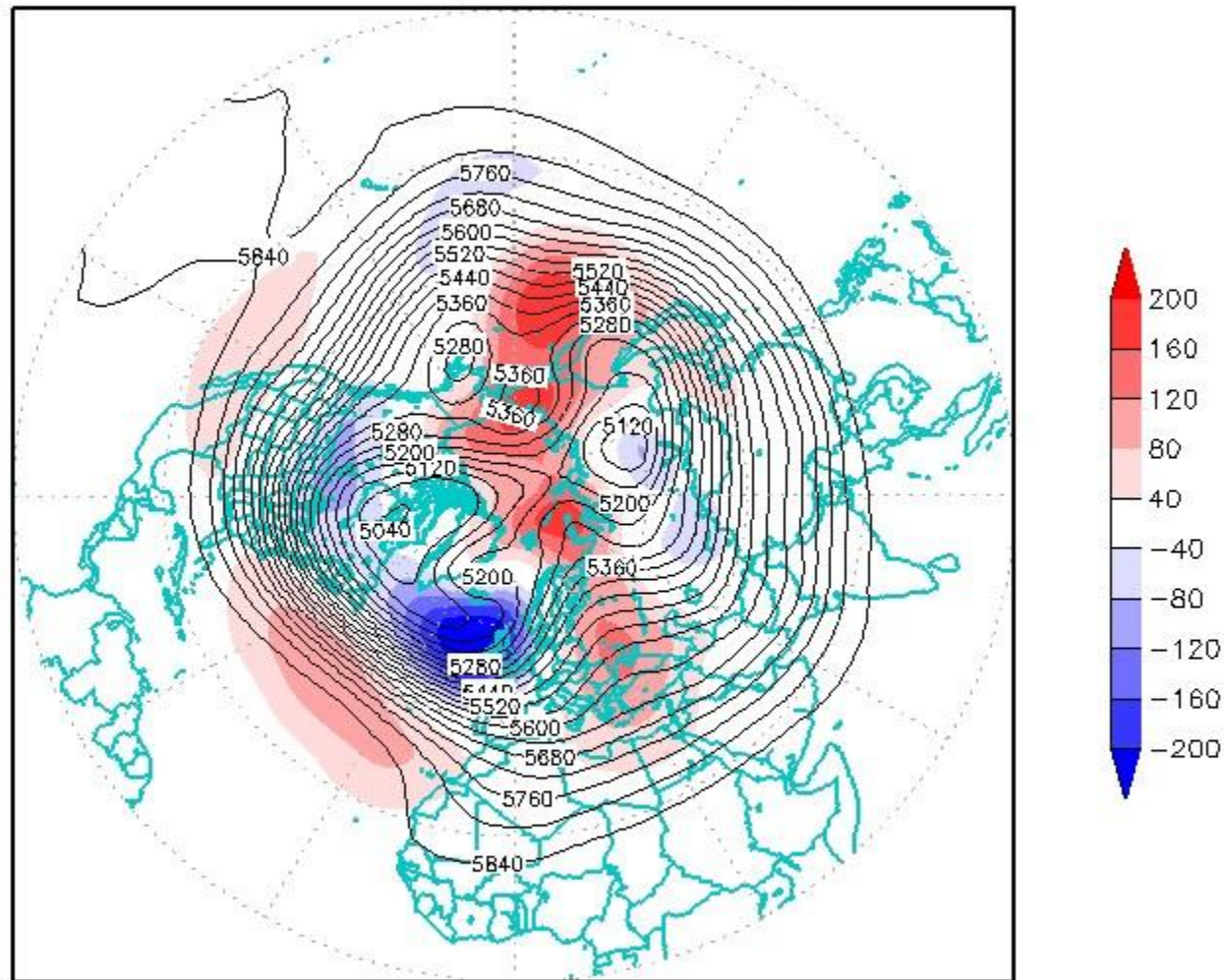
March 2013



Prognozljivost od 1.-10. dana: fc0=obs fcn1-fc8=NMMB fct VS NCEP climatology & reanalysis

Bloking na Pacifiku, februar 2014. godine

Feb2014 AT500 hgt and anomaly 61–90

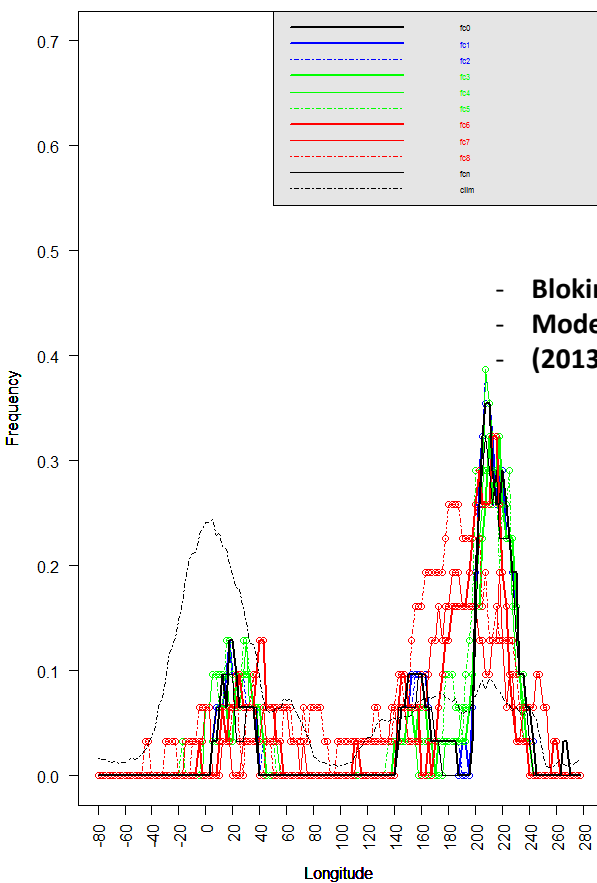


	NAO	EA	WP	EP/NP	PNA	EA/WR	SCA	TNH	POL	PT	Expl. Var.
81–10:	1.07	2.23	-1.37	0.31	-1.57	-1.93	1.10	0.27	-1.86	-99.90	74.9

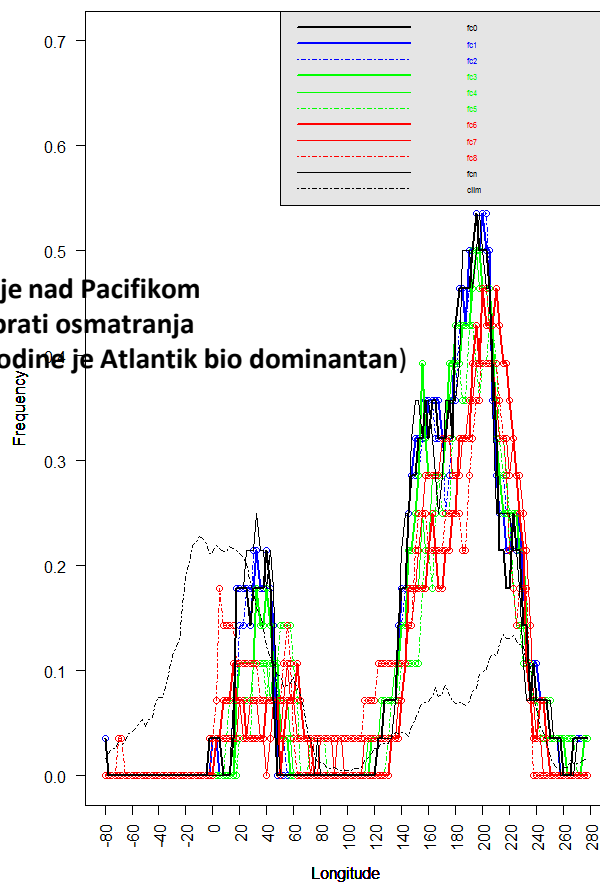
Prognoza bloking indeksa NMMB globalnim modelom

Monthly overview of blocking frequency

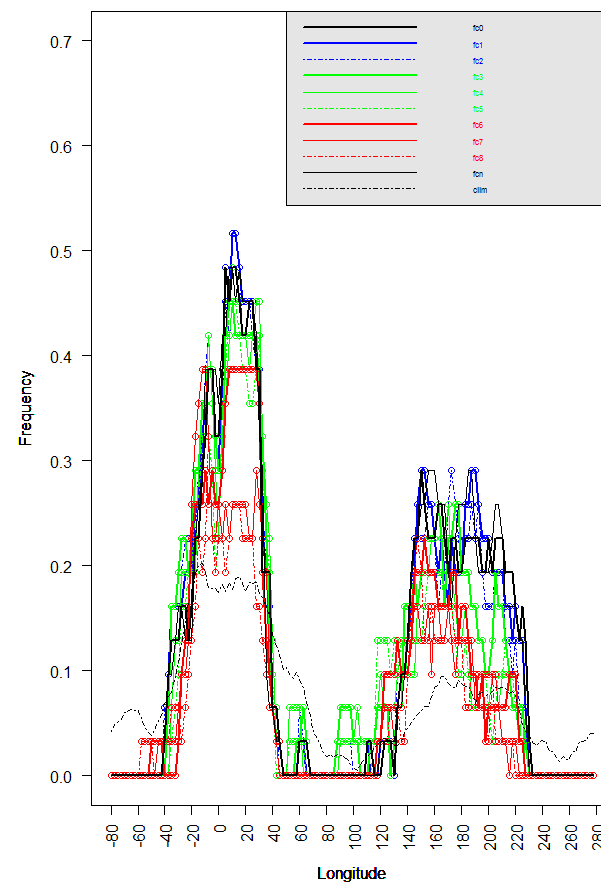
January 2014



February 2014



March 2014



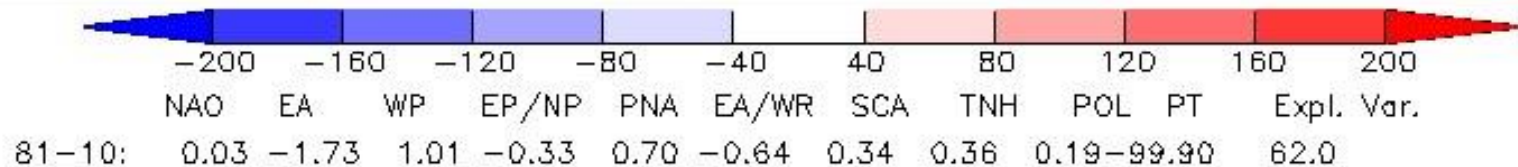
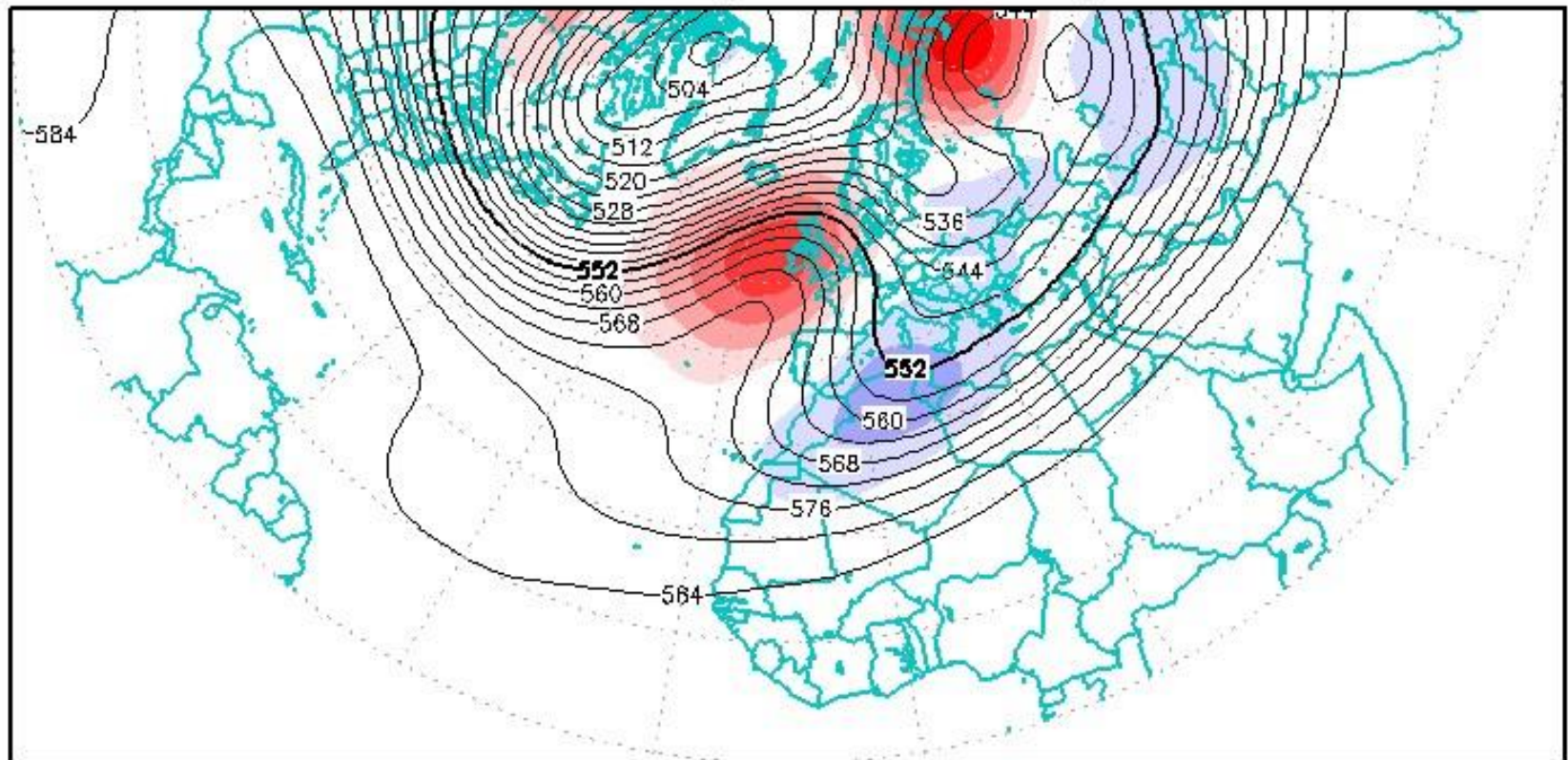
- Blokiranje nad Pacifikom
- Model prati osmatranja (2013. godine je Atlantik bio dominantan)

Sneg u Srbiji februar 2012. godine

(bloking zapadno i istočno u odnosu na Evropu/Balkan)

Bloking februar 2012. godine

Feb2012 AT500 hgt and anomaly 81-10

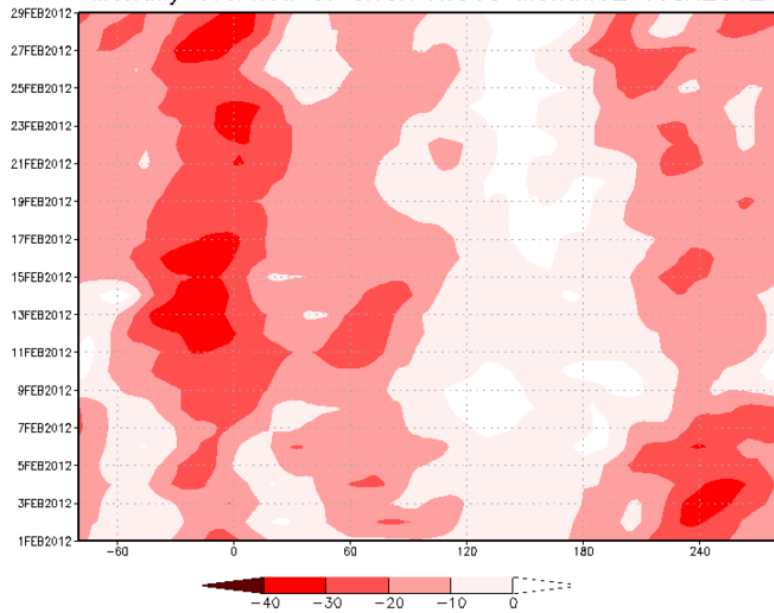


Polje strujanja na visini je jugozapadno(vlažan i topao vazduh iz Mediterana), a u prizemlju je hladan vazduh (koji se od sibirskog anticiklona spustio do naših prostora)

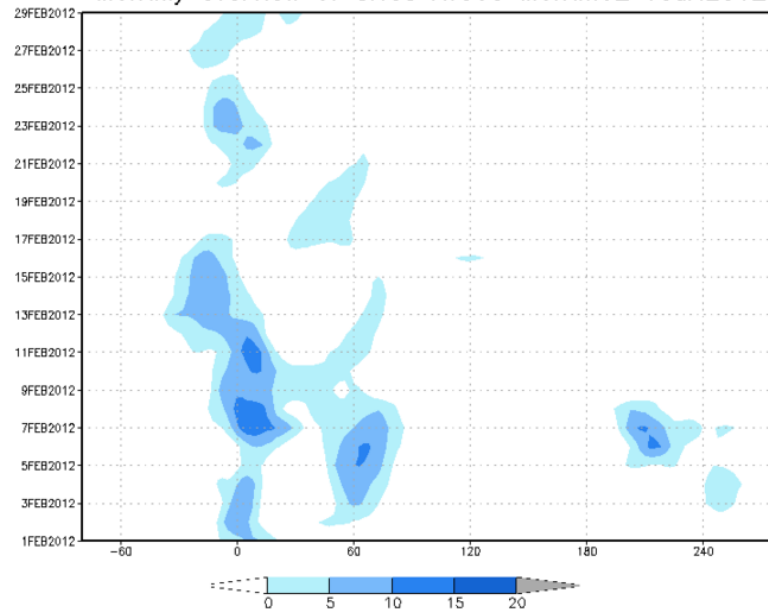
- Dovoljno je da barem za jednu centralnu širinu budu zadovoljeni uslovi u pogledu GHGN i GHGS
- Ukoliko su zadovoljeni uslovi za sve tri centralne geografske širine, to nam onda govori da je sistem veoma razvijen u pogledu prostornih razmera

Blocking februar 2012. godine

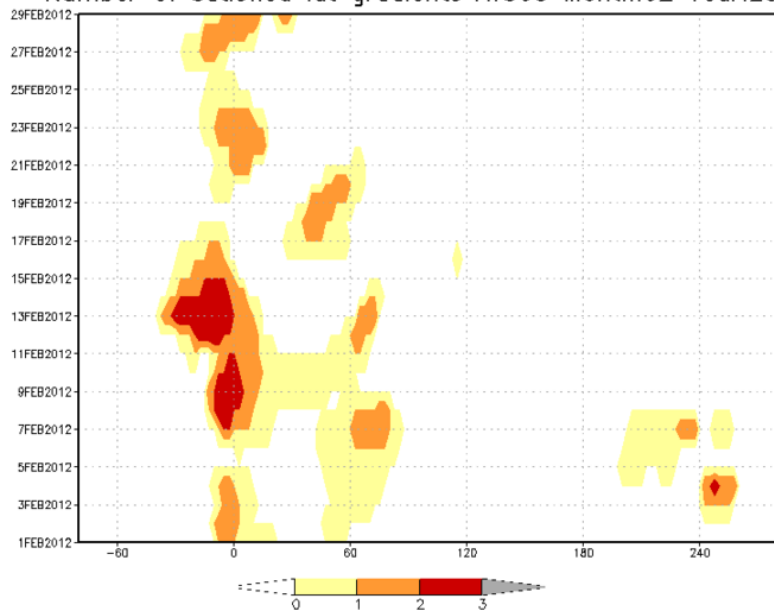
Monthly overview of GHGN AT500 Month:02 Year:2012



Monthly overview of GHGS AT500 Month:02 Year:2012

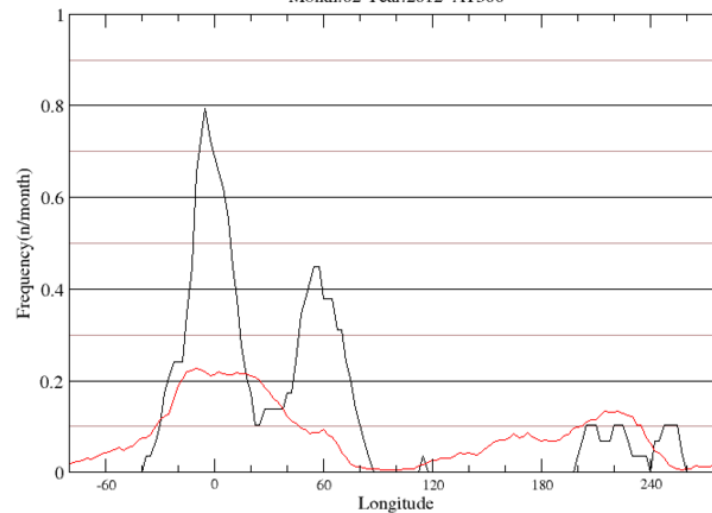


Number of satisfied lat gradients AT500 Month:02 Year:2012



Monthly overview of blocking frequency clim(1981-2010)

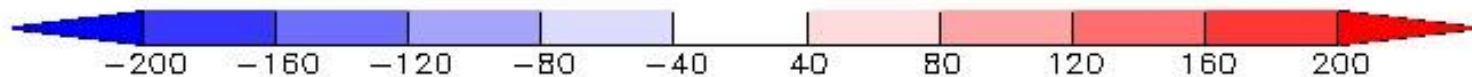
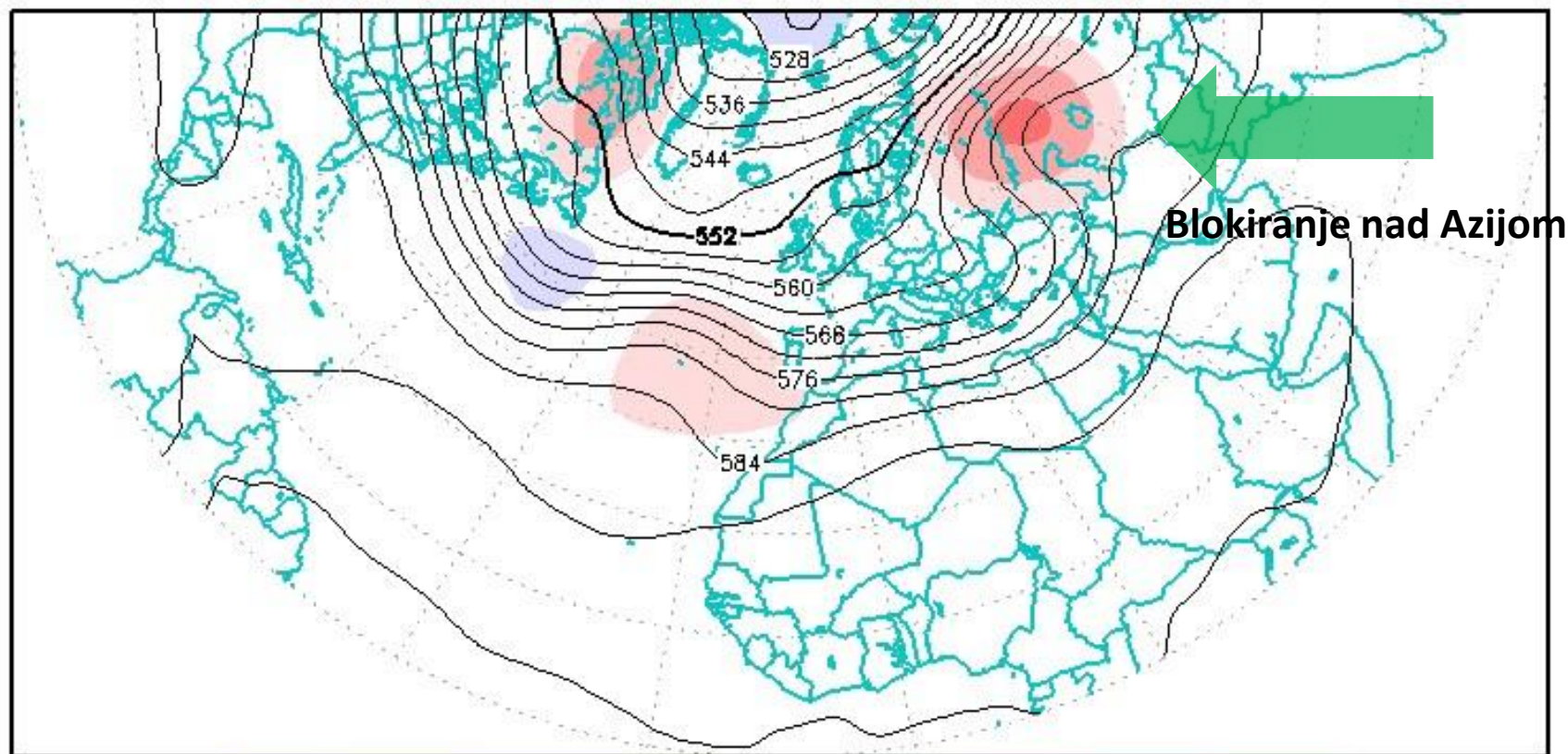
Month:02 Year:2012 AT500



Poplave u Srbiji maj 2014. godine
(bloking istočno od Balkana)

Globalna cirkulacija maj 2014. godine

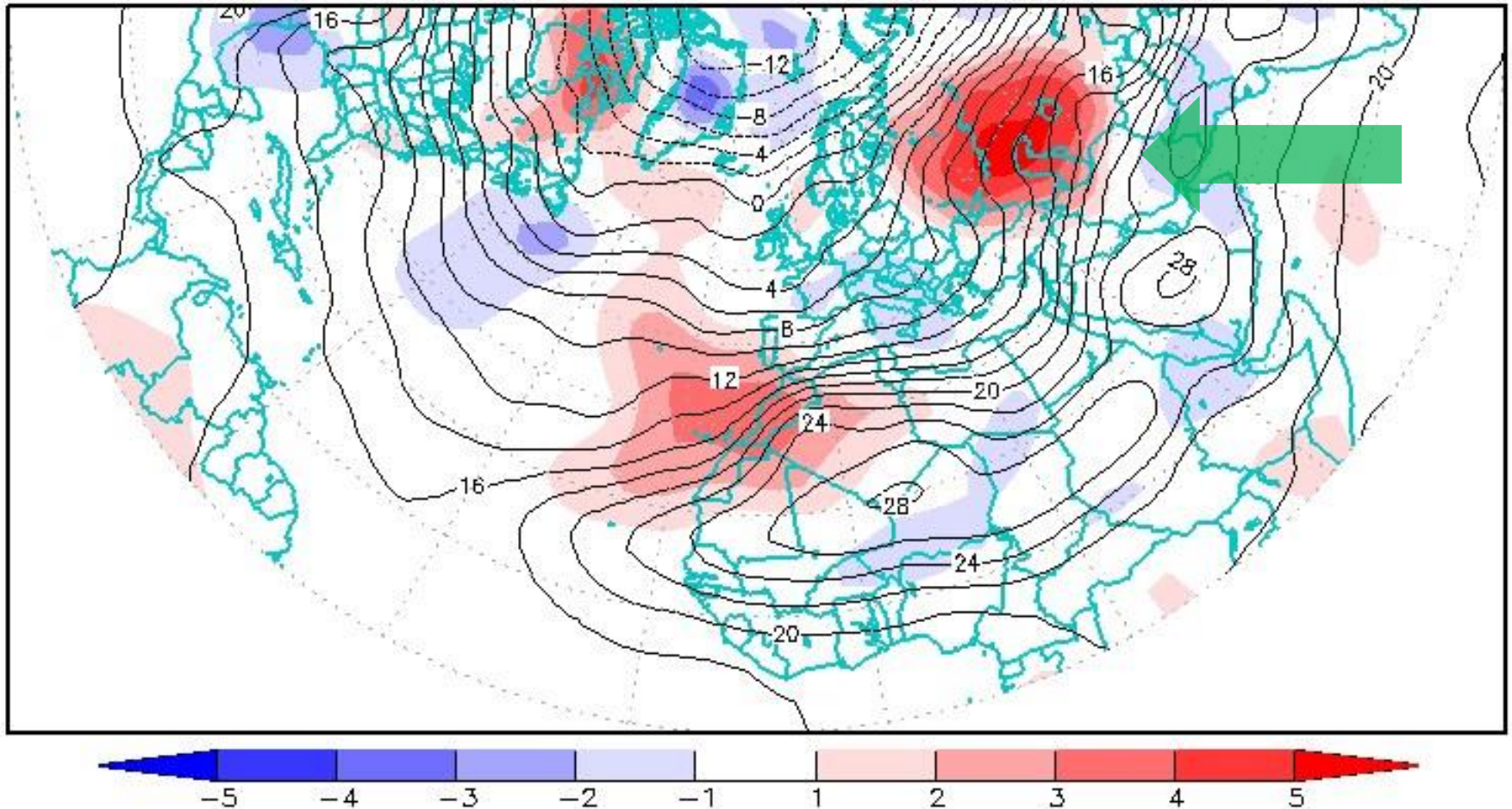
May2014 AT500 hgt and anomaly 81-10



	NAO	EA	WP	EP/NP	PNA	EA/WR	SCA	TNH	POL	PT	Expl. Var.
81-10:	-0.80	0.38	-0.85	0.77	-0.59	-1.45	-0.49	-99.90	0.98	-99.90	36.1

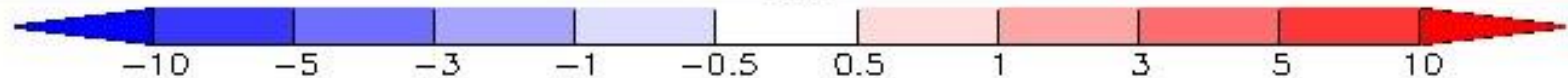
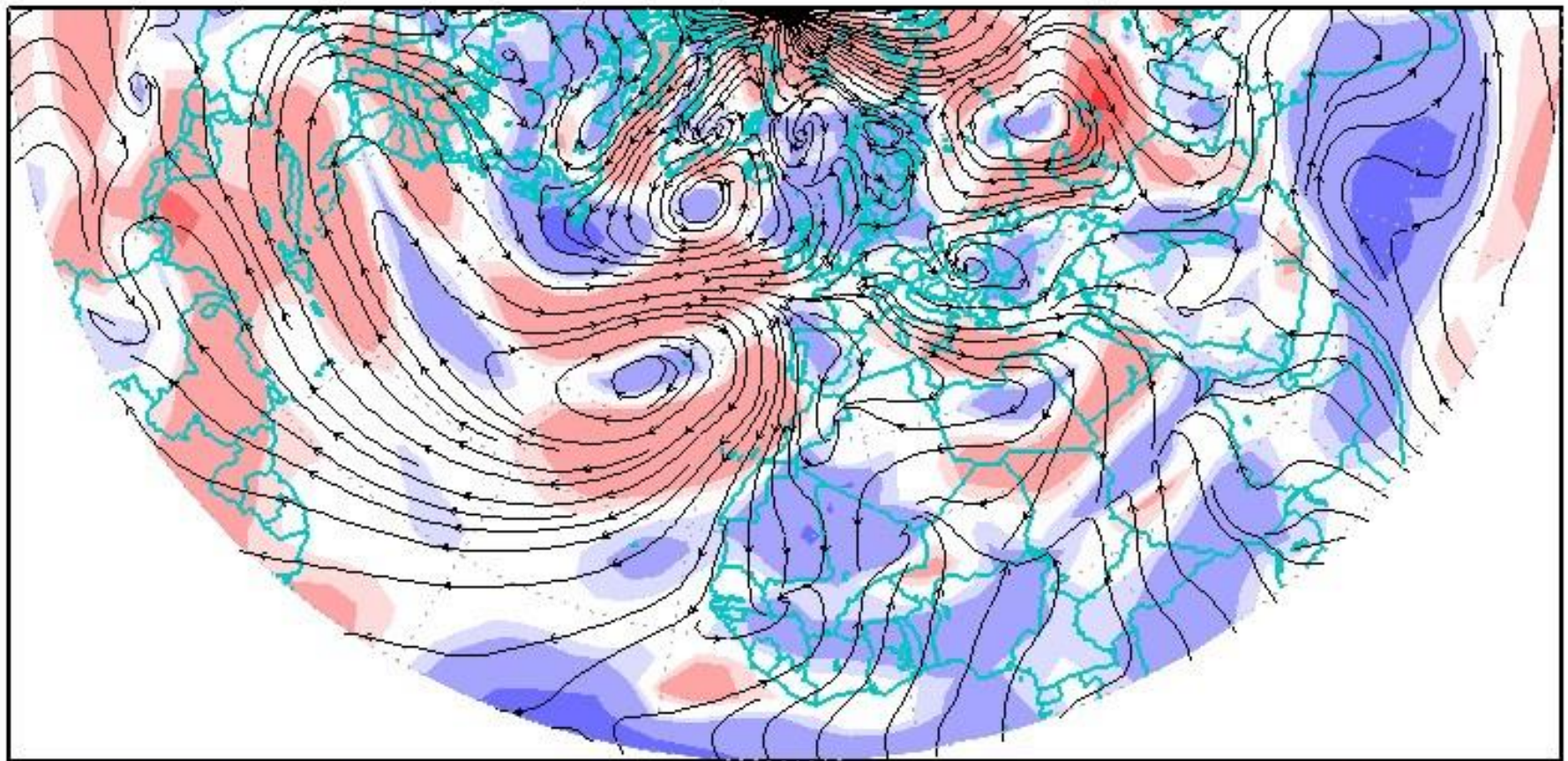
Globalna cirkulacija maj 2014. godine

May2014 AT850 Temp and anomaly 81-10



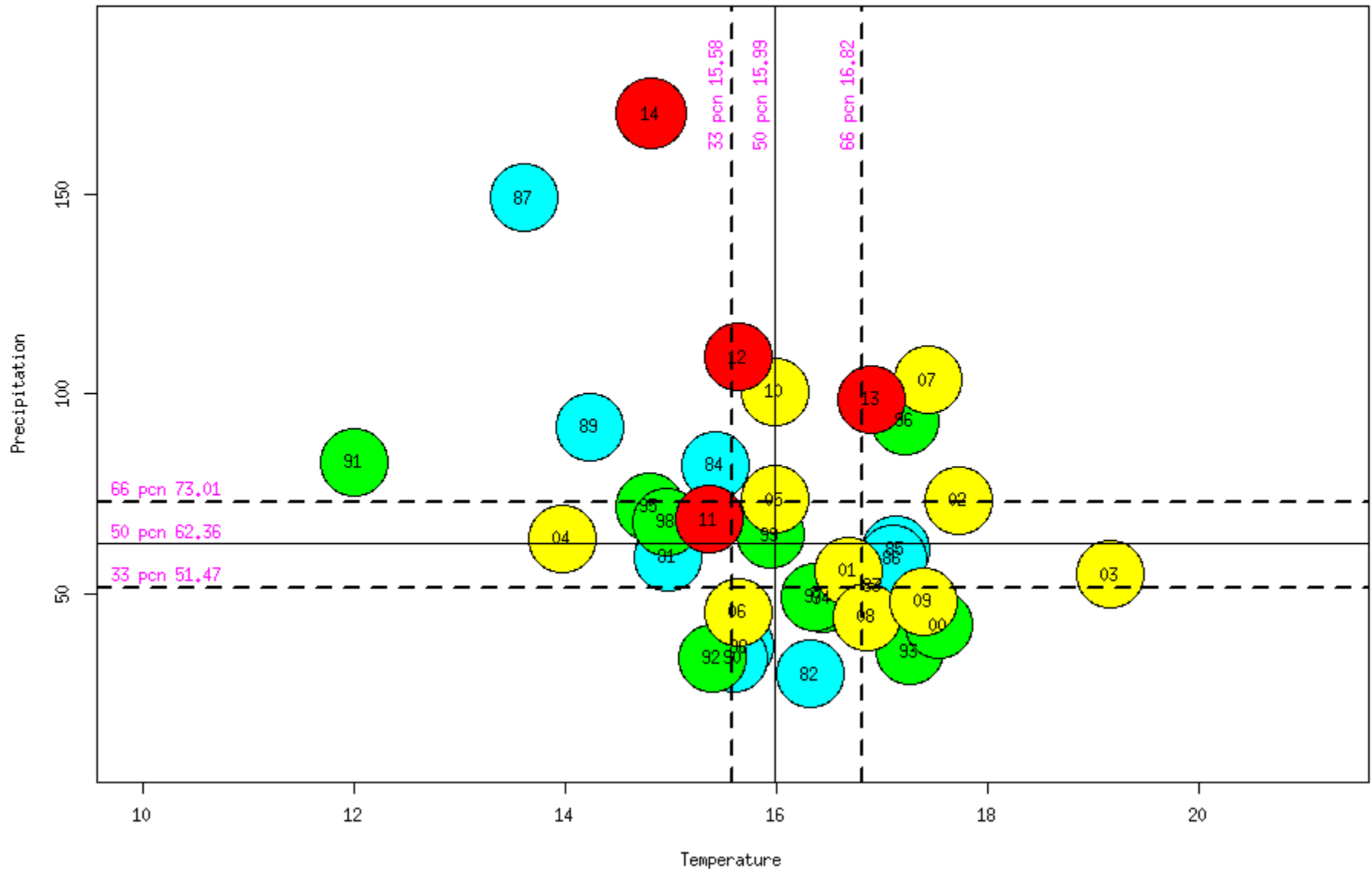
Globalna cirkulacija maj 2014. godine

May2014 AT925 wind and anomaly 81–10



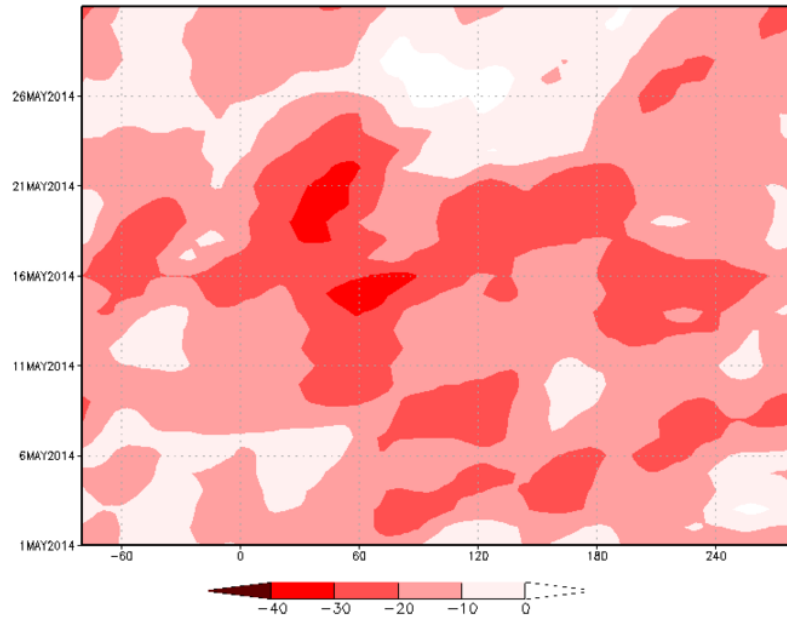
Kako se bloking situacija odrazila na padavine u Srbiji?

Monthly mean / May / Serbia(clim 1981-2010)

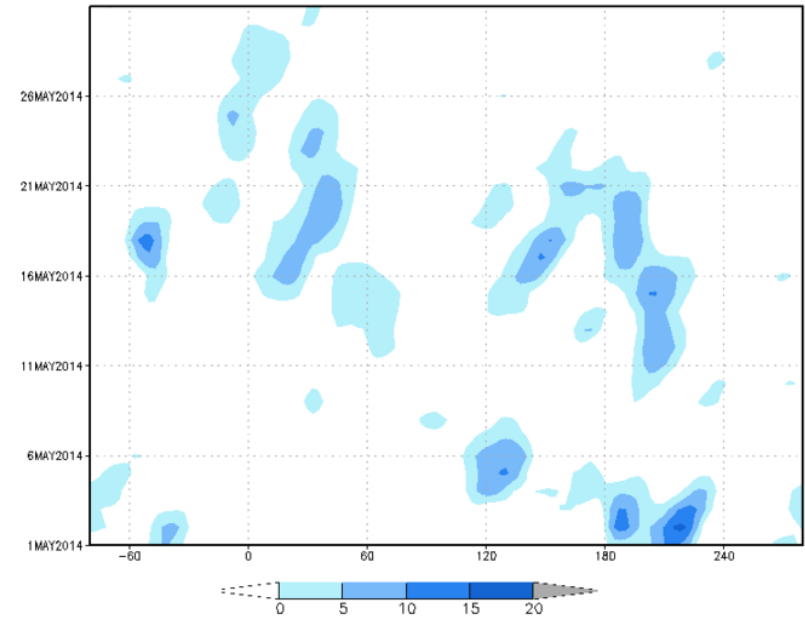


Bloking maj 2014. godine

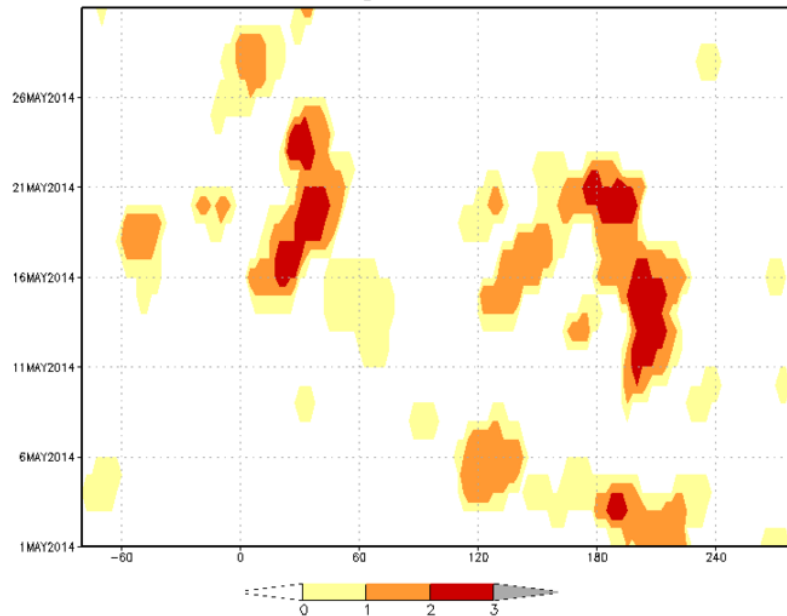
Monthly overview of GHGN AT500 Month:05 Year:2014



Monthly overview of GHGS AT500 Month:05 Year:2014

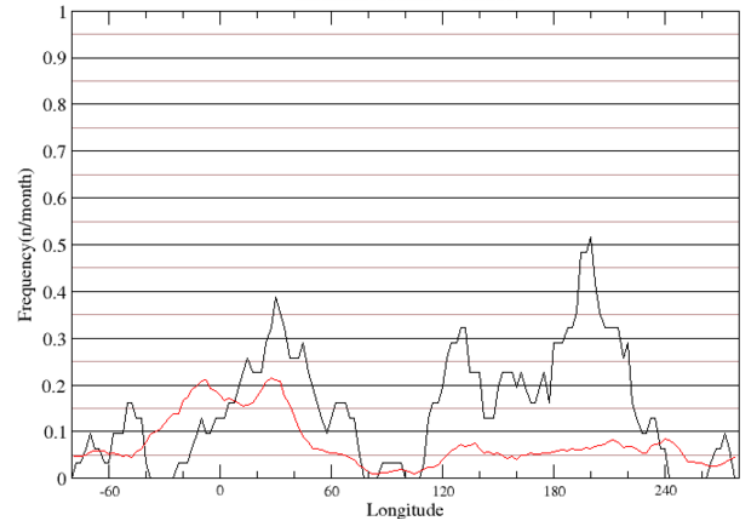


Number of satisfied lat gradients AT500 Month:05 Year:2014

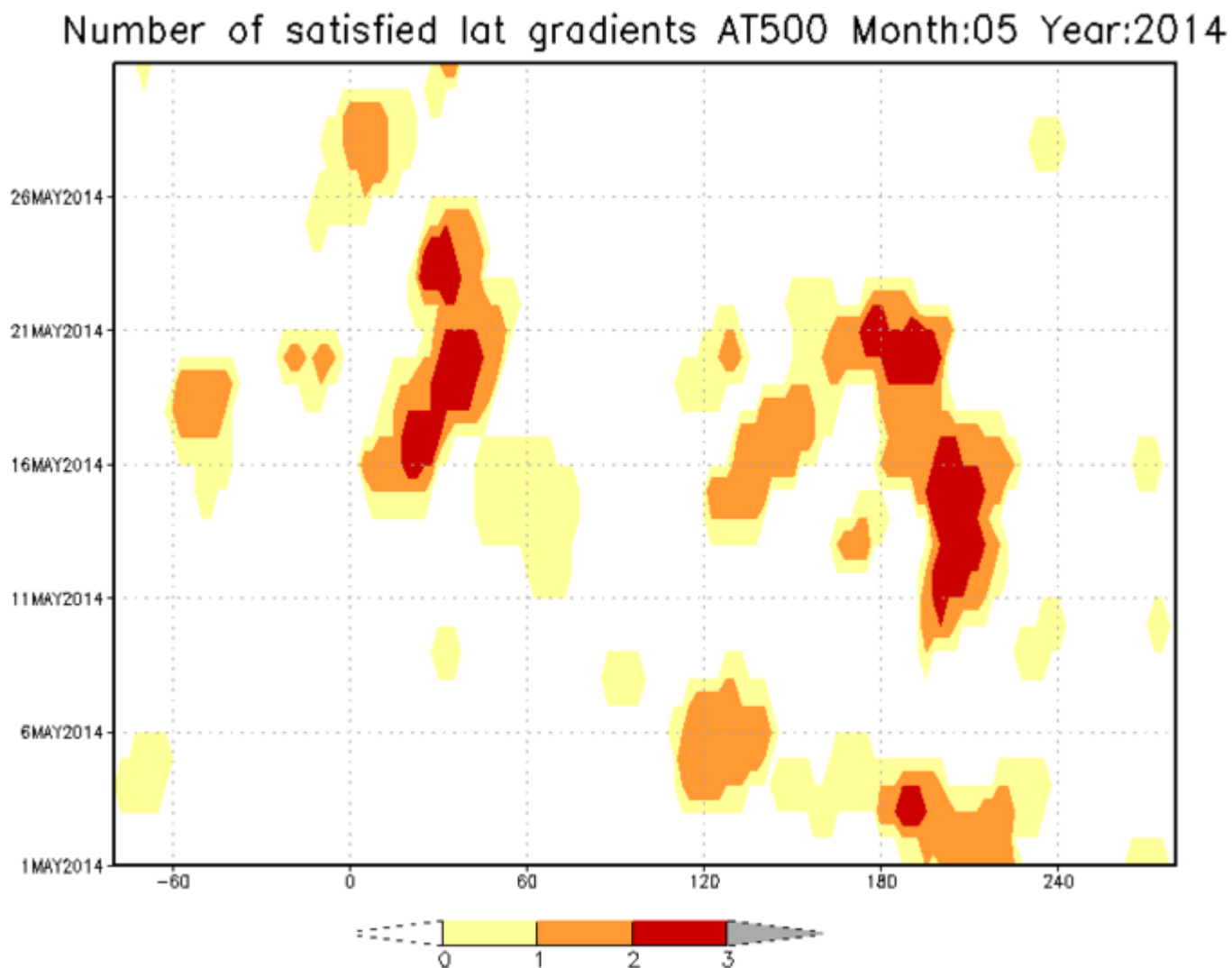


Monthly overview of blocking frequency clim(1981-2010)

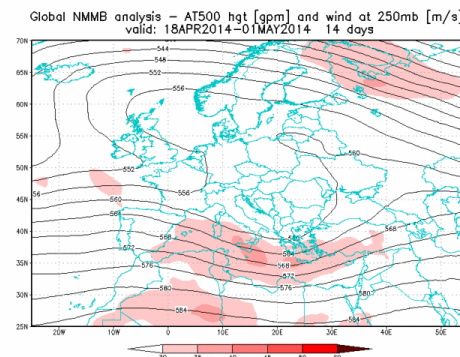
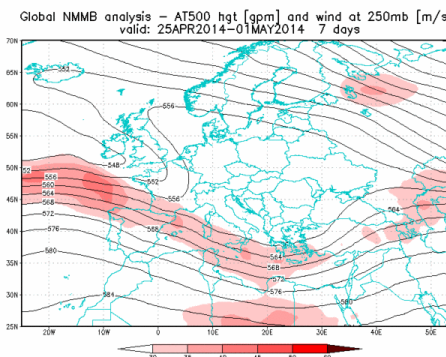
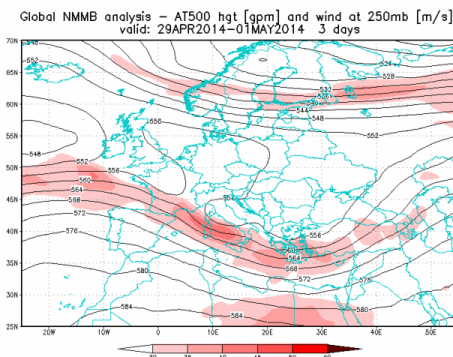
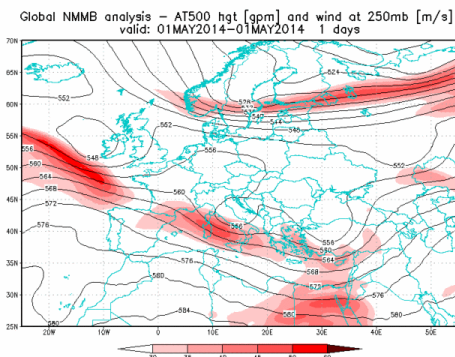
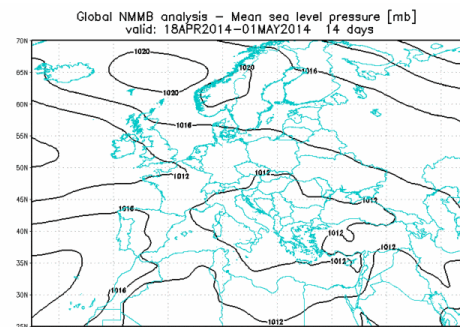
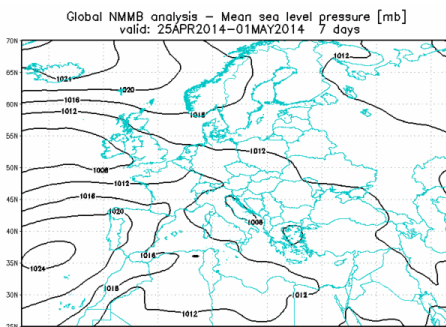
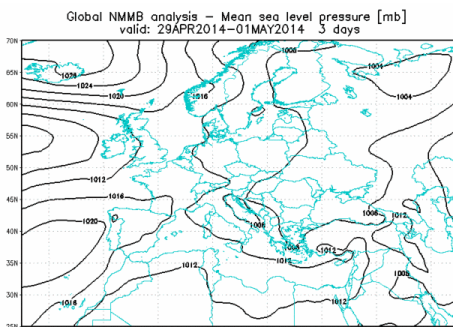
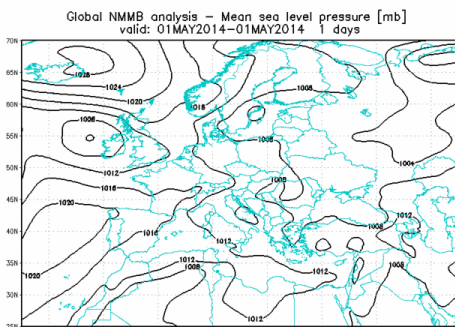
Month:05 Year:2014 AT500



Broj zadovoljenih latitudinalnih gradijenata



NMMB prognoza



Sr. vr. za 1 dan

Sr. vr. za 3 dana

Sr. vr. za 7 dana

Sr. vr. za 14 dana

Svi podaci su iz prvog dana prognoze.

Pokazuje se da se sistem održava u periodu od oko nedelju dana.