

APCC Training (19-30 Nov. 2012)

PAKISTAN

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Pakistan - Map



Effect of Location on Climate of Pakistan

- Pakistan lies in the temperate zone, The climate is generally arid, characterized by hot summers and cool or cold winters, and wide variations between extremes of temperature at different locations.
- For example, the coastal area along the Arabian Sea is usually warm, whereas the frozen snow-covered ridges of the Karakoram Range and of other mountains of the far north are cold .



GEOGRAPHY

- Location: 23'35 ~ 37'05 North Latitude
60'50 ~ 77'50 East Longitude
- Area: 796,095 sq kms
- Coast line: 1,046 km
- Rivers / Length: 5 / 7,813 Km
- Mountains: 5 /14 (> 8000 Metres); 108 > 7000 Metres; 100 > 6000 Metres; & many peaks above 4000 Metres
- Deserts: 3

Seasons Of Pakistan

Winter season (Dec - Feb)



Summer season (Jun-Sep)



Autumn Season (Oct-Nov)



Spring Season (Mar-May)



Weather Systems in Pakistan

- Monsoon System: SW
Monsoon in Summer season is main rain producing system for Pakistan
- Westerly system: Winter
system feed glaciers in the form of snowfall .



RECENT CLIMATE TRENDS

- **Temperature** (MAT 18 C)

- Mean annual temperature is rising by 0.08 C/dec since 1960.
- The rate of increase is most rapid in winter besides no evidence of increase in summer.
- The frequency of hot days and nights has increased by 5.5% and 6.4% of days, respectively since 1960.
- The frequency of cold days and nights has increased by 2.7% and 3.6% of days respectively since 1960.

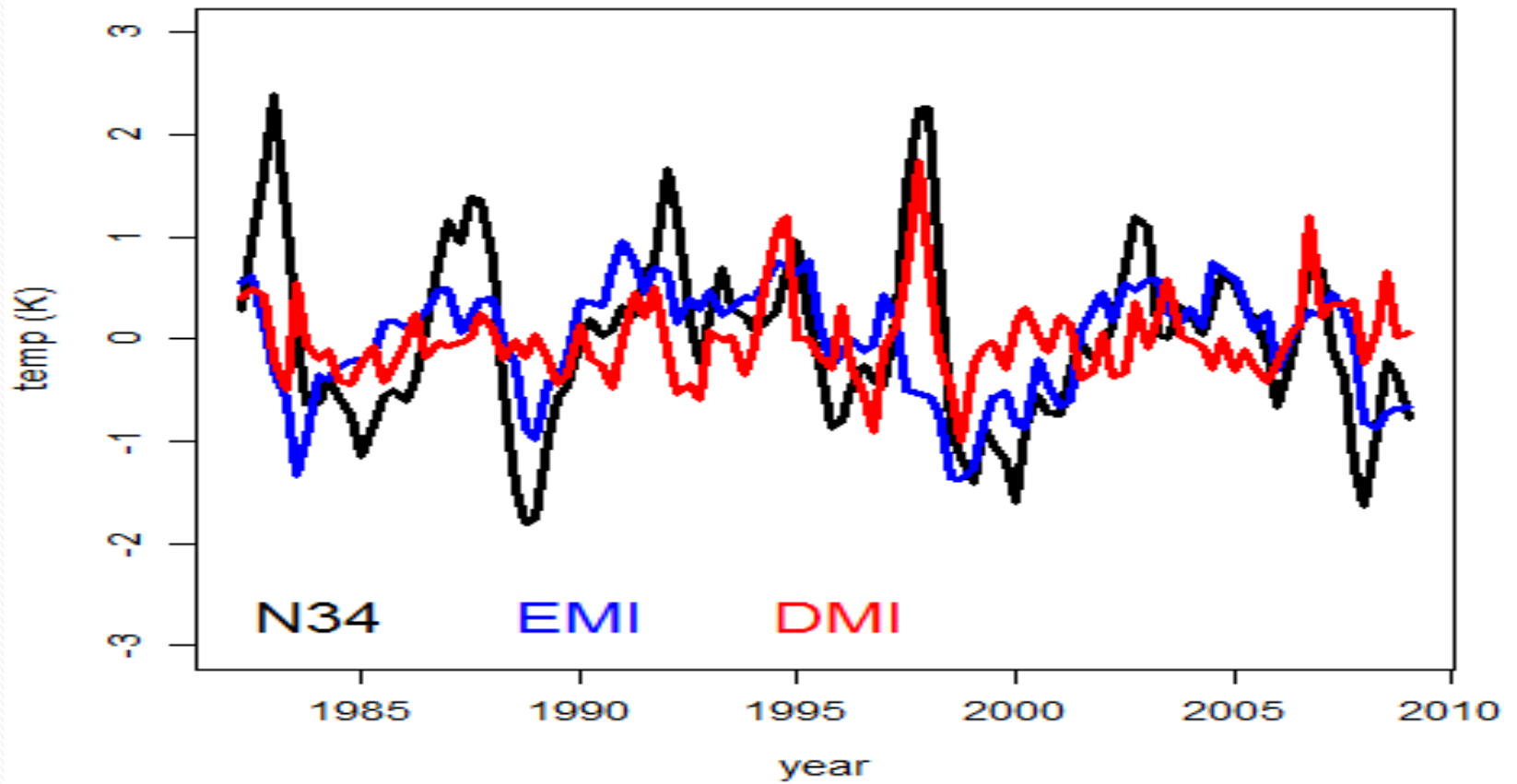
- **Precipitation**

- Annual rainfall ranges 760-2000 mm in northern parts while Southern Parts receive 250 mm rainfall
- Mean annual rainfall - not changed since 1960. However, pattern is slightly changing from south to north.

R Software

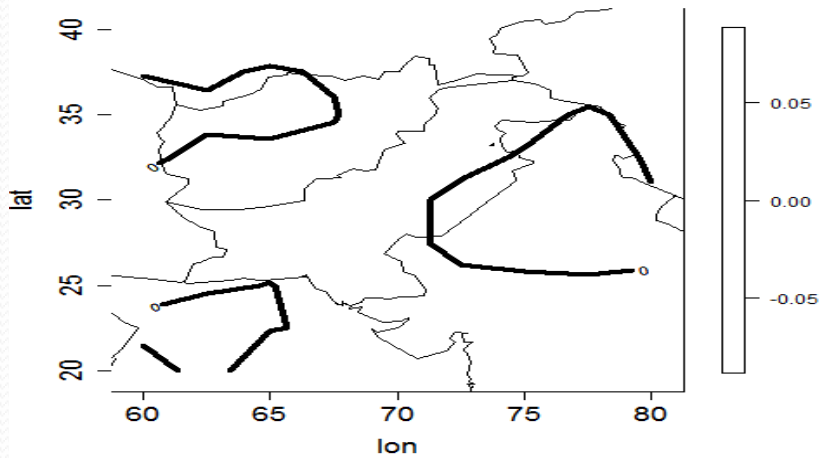
- R is integrated software environment for data manipulation, calculation & graphical display
- It is used to carry out complicated statistical analysis.
- NCEP CFS model hind cast data
- NCEP Reanalysis data from 1982-2008
- Three main indices are used as predictor
 - ELNINO3.4
 - EMI
 - DMI

SST Indices

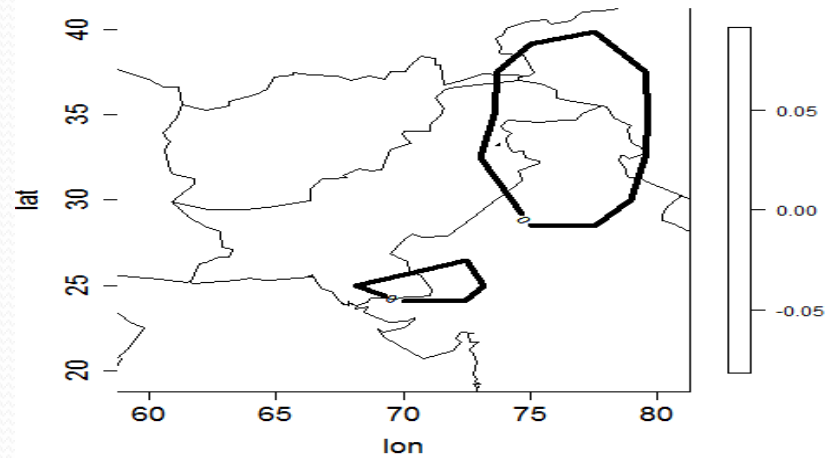


PRCP(DJF)

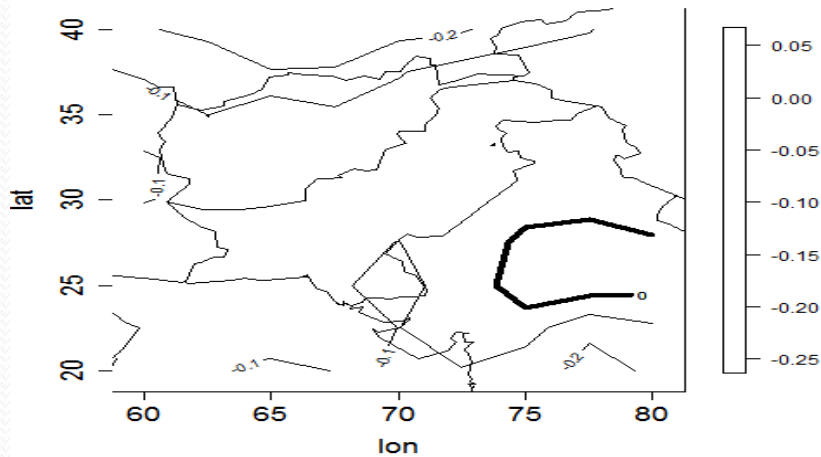
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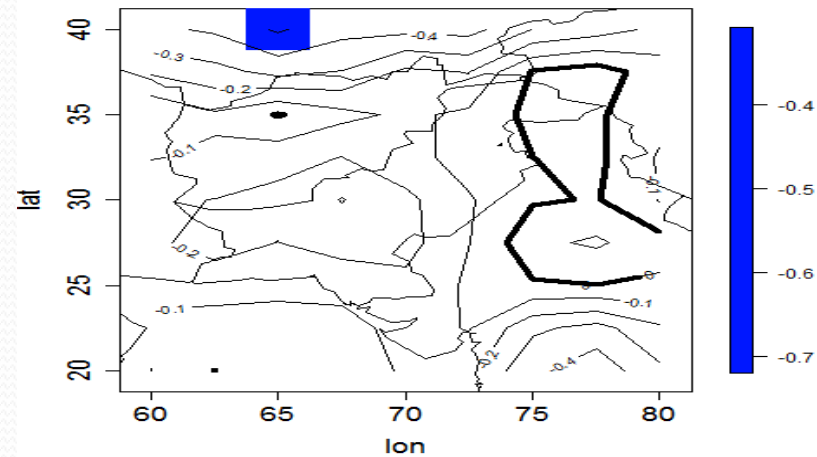
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Skill using CLIM+DMI: -0.078

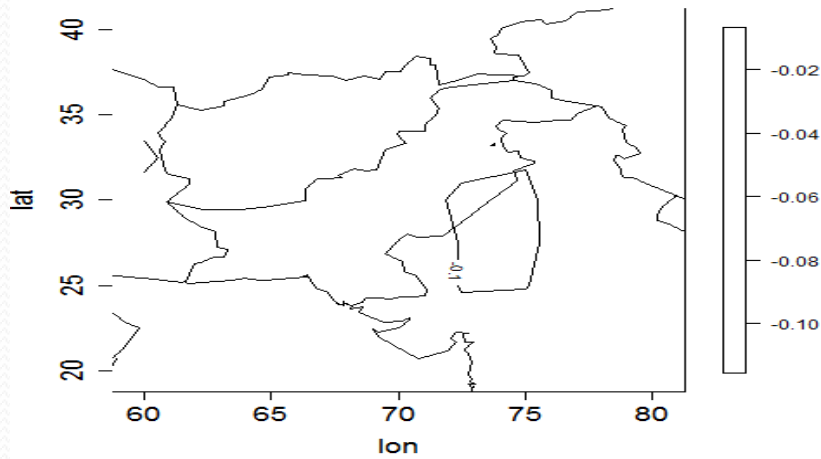


Skill using ALL: -0.138

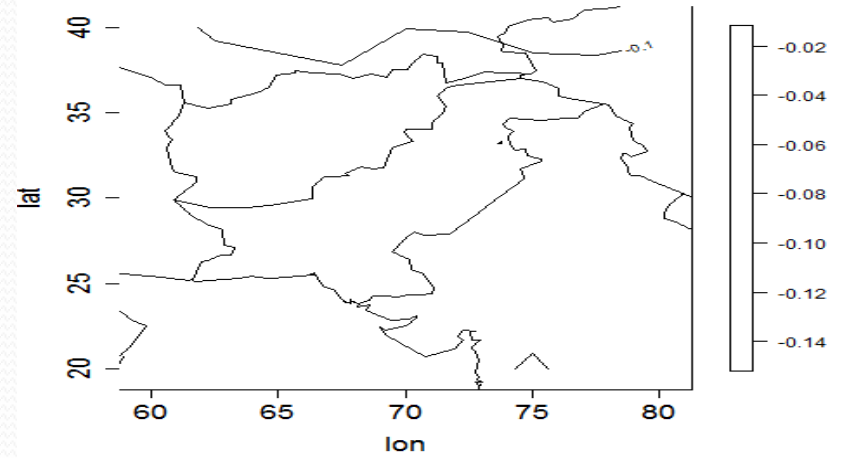


PRCP(JJA)

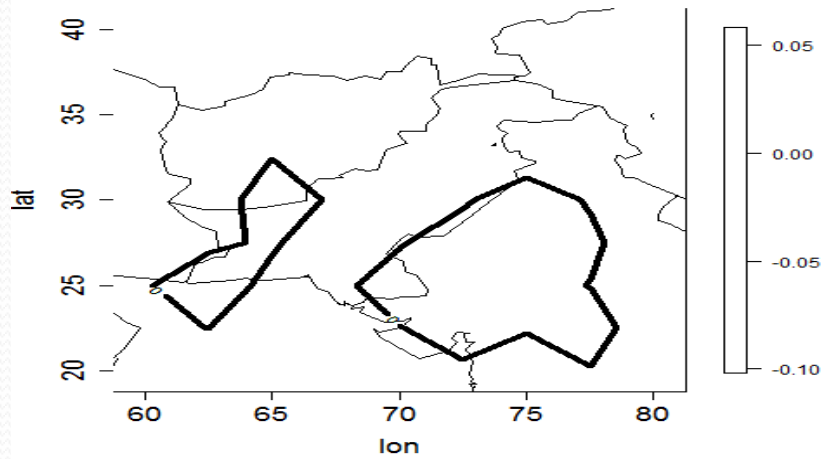
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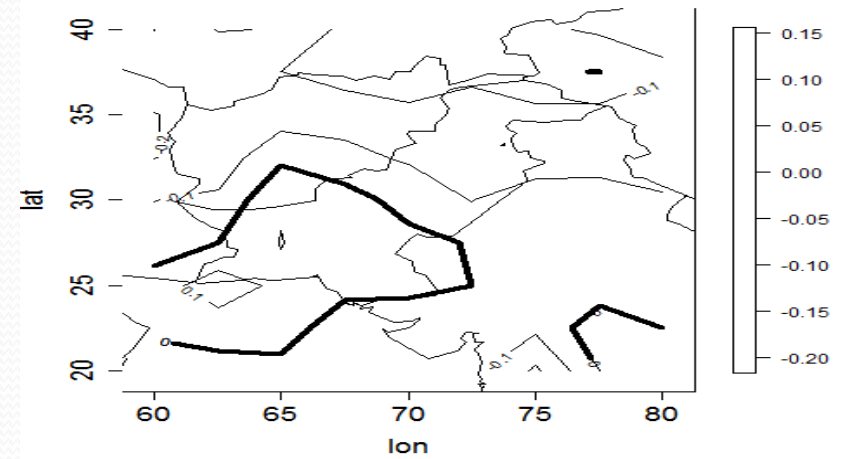
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Skill using CLIM+DMI: -0.029

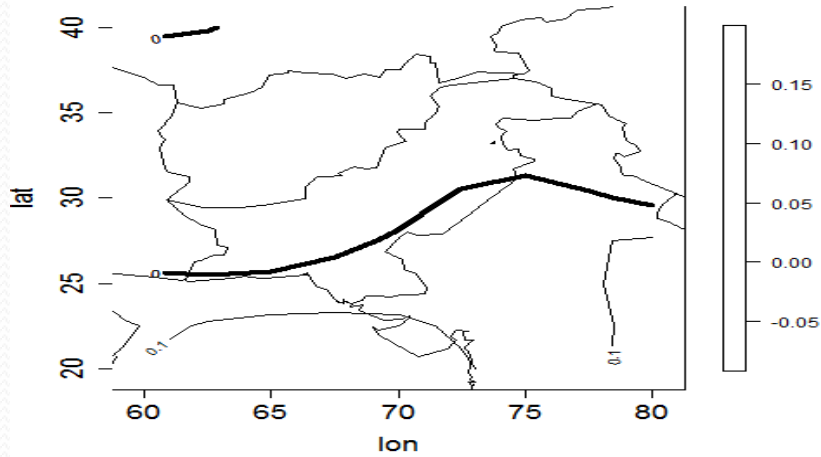


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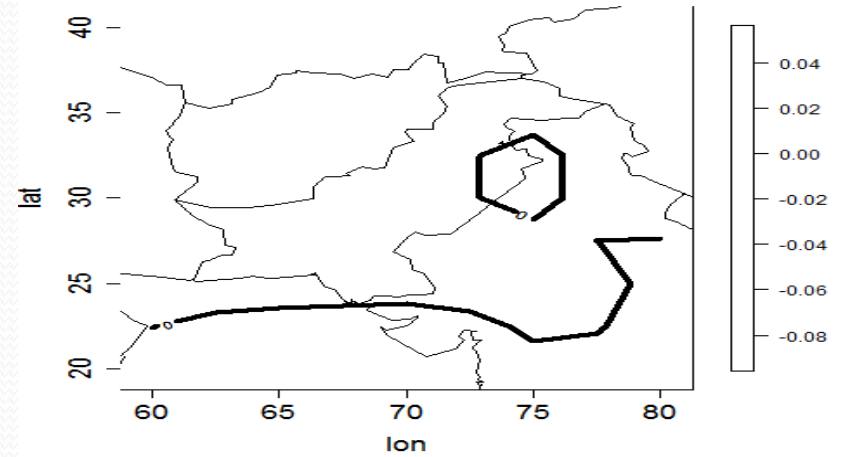


SLP(DJF)

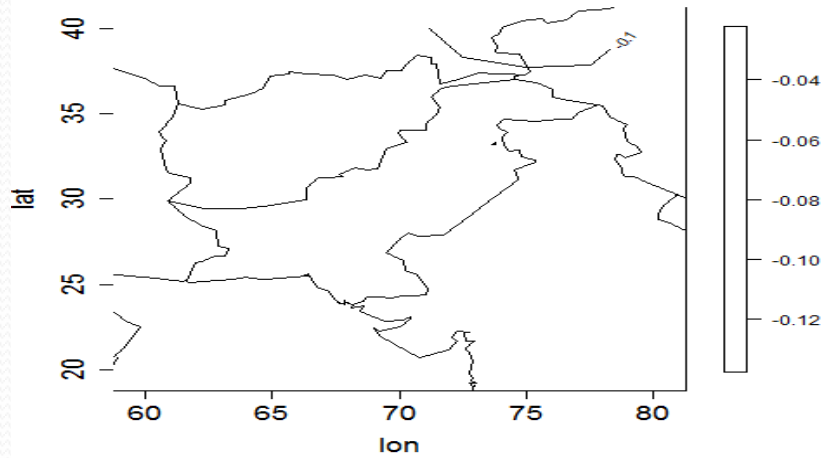
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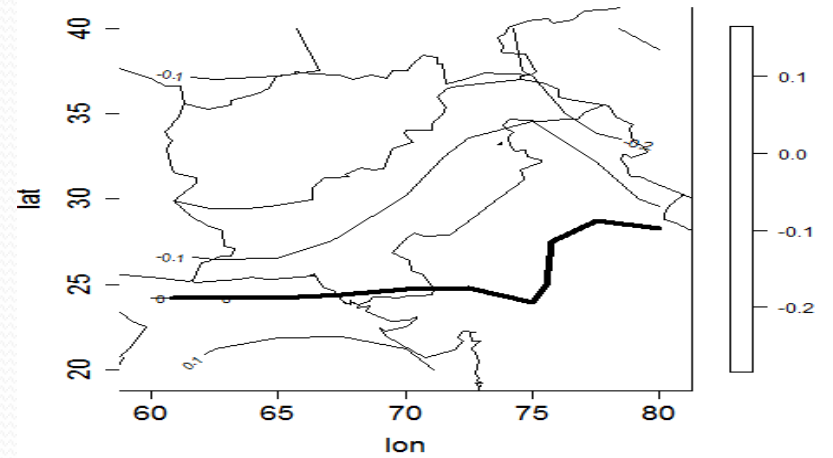
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Skill using CLIM+DMI: -0.064

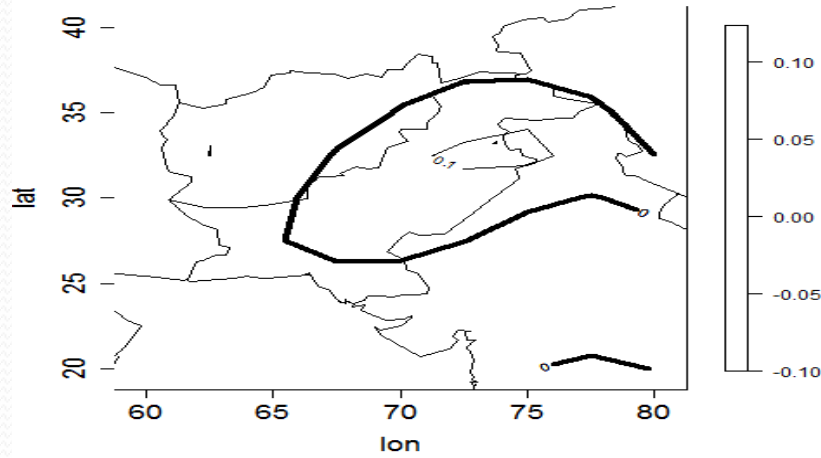


Skill using ALL: -0.058

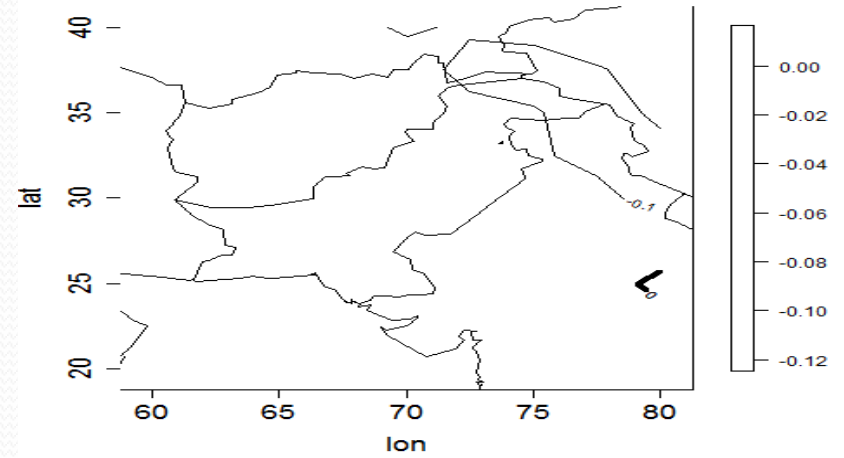


SLP(JJA)

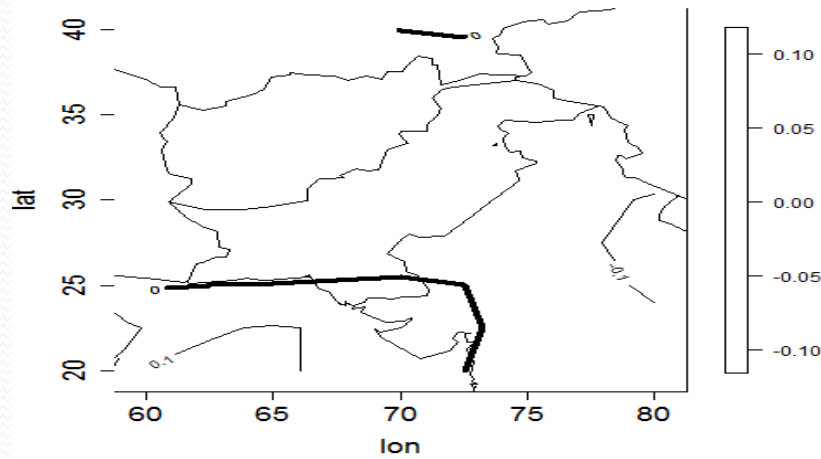
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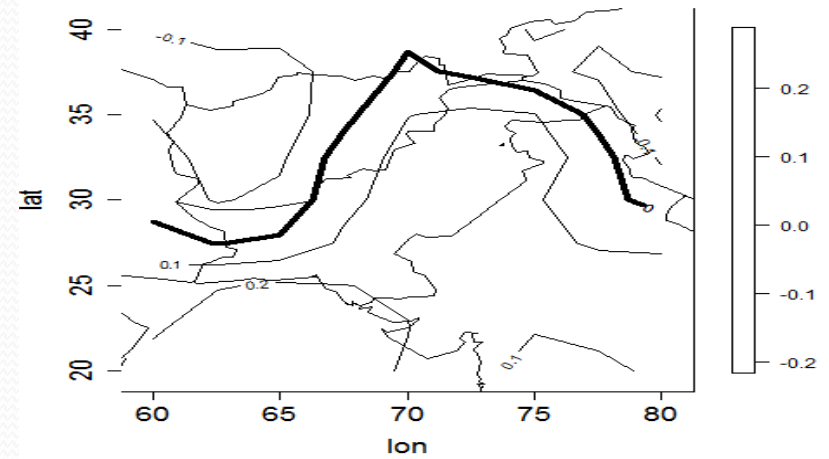
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Skill using CLIM+DMI: -0.034

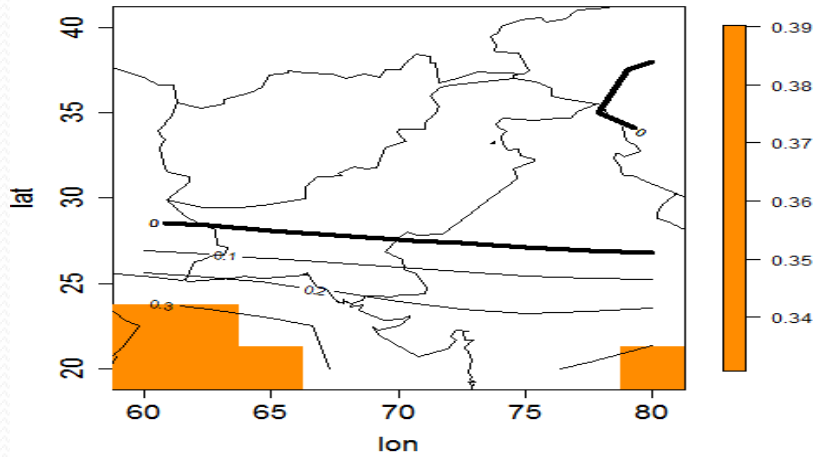


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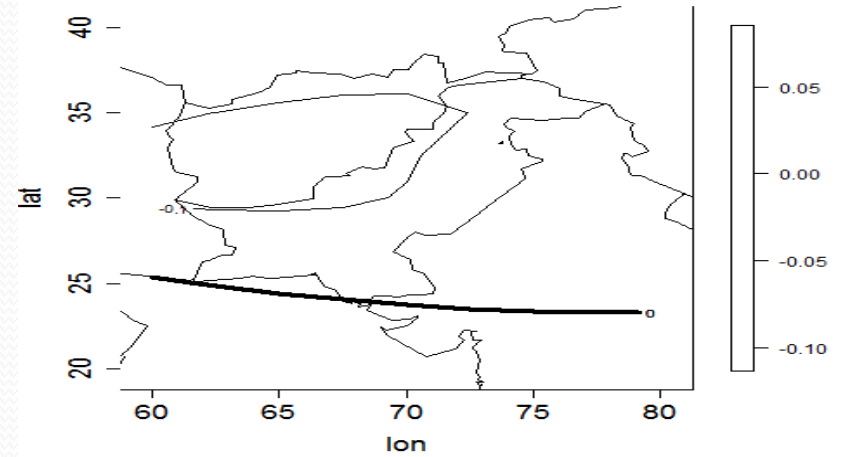


U200(DJF)

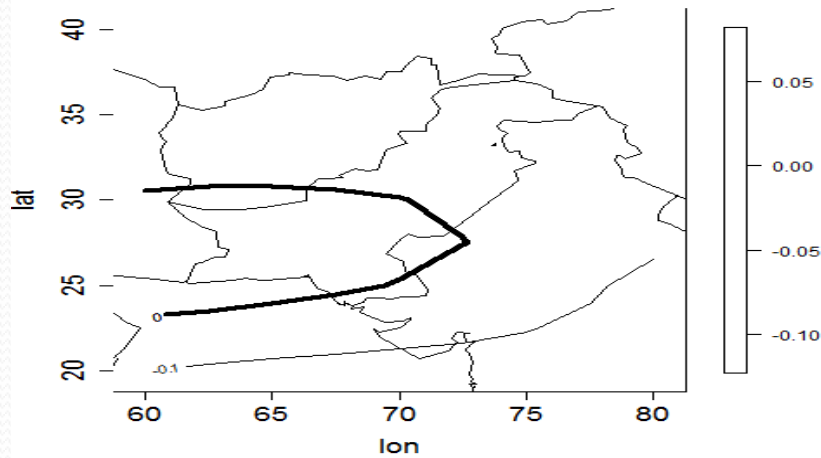
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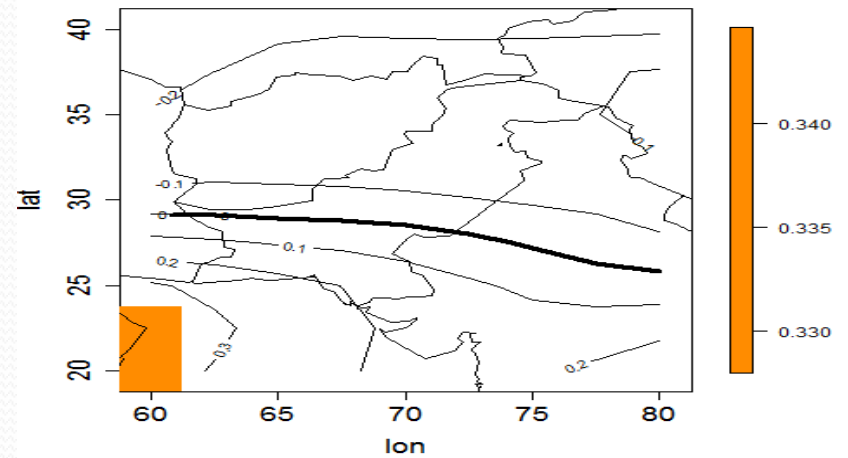
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Skill using CLIM+DMI: -0.047

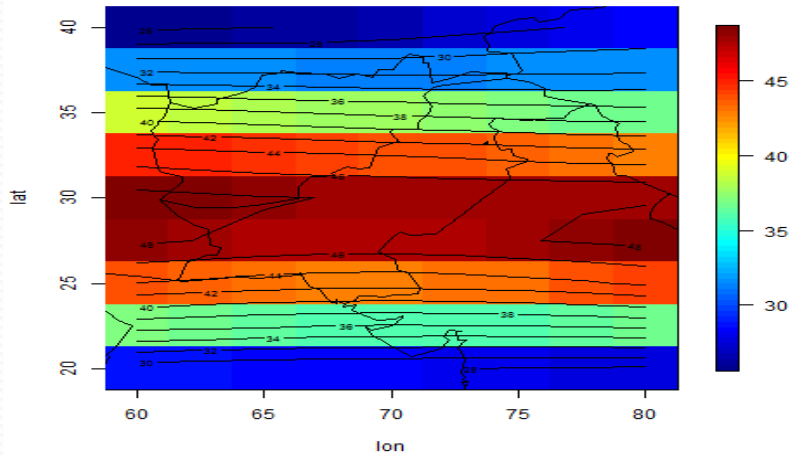


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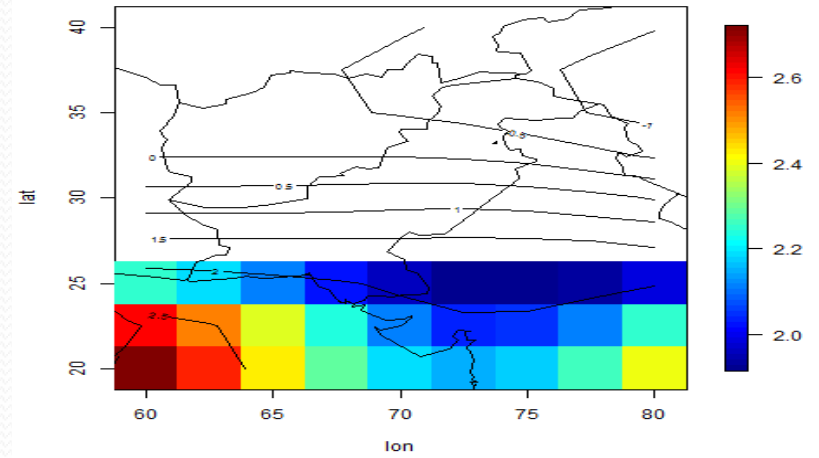


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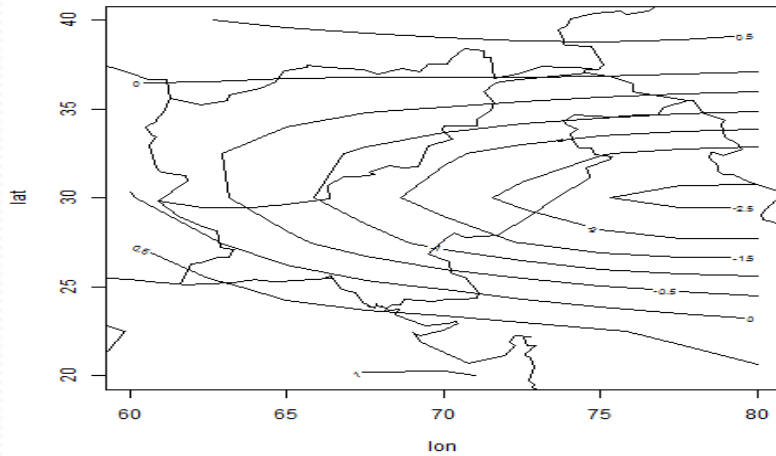
LS Coefficients for CLIM



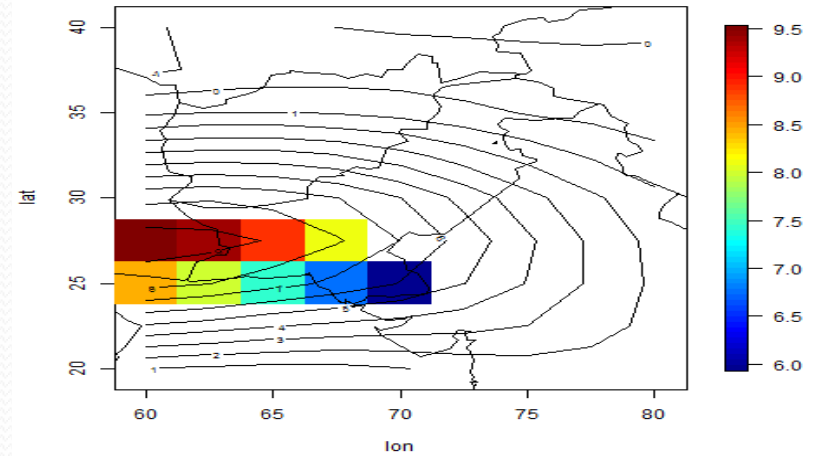
LS Coefficients for N34



LS Coefficients for EMI

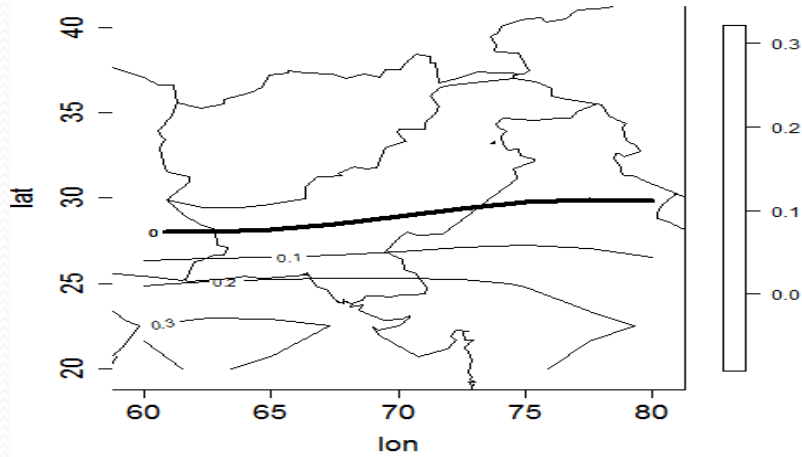


LS Coefficients for DMI

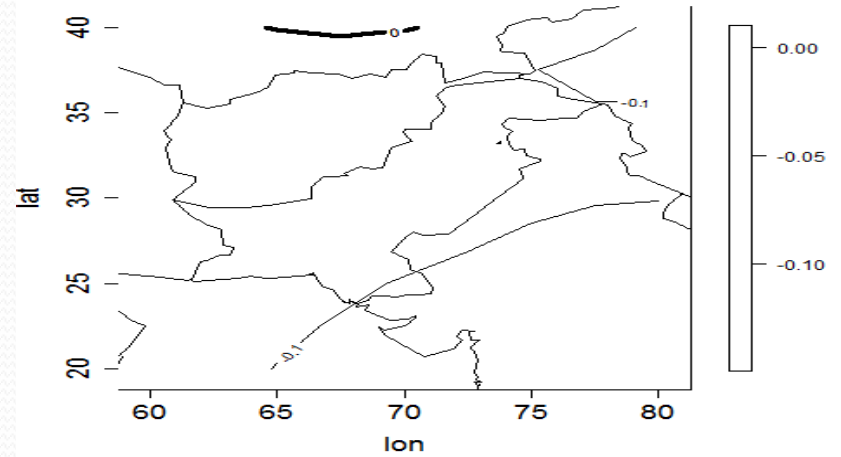


U200(JJA)

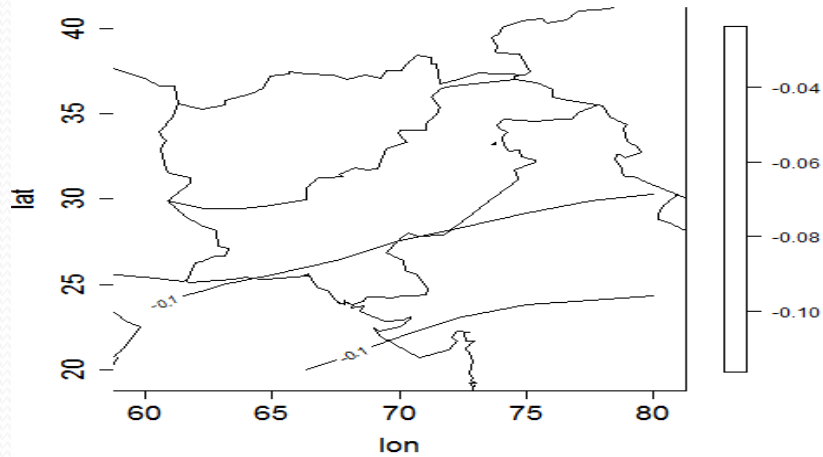
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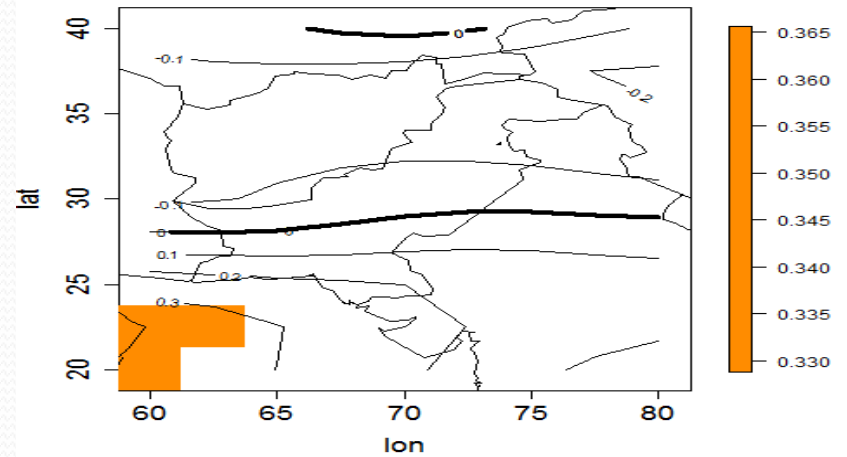
Skill using CLIM+EMI: -0.079



Skill using CLIM+DMI: -0.078

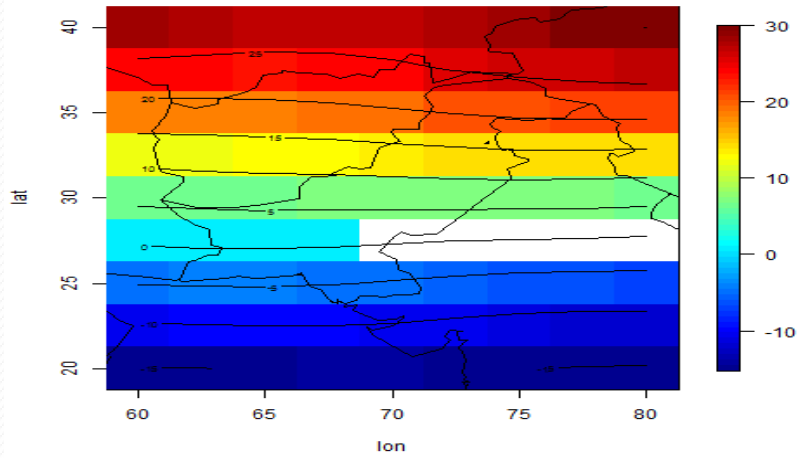


Skill using ALL: 0.022

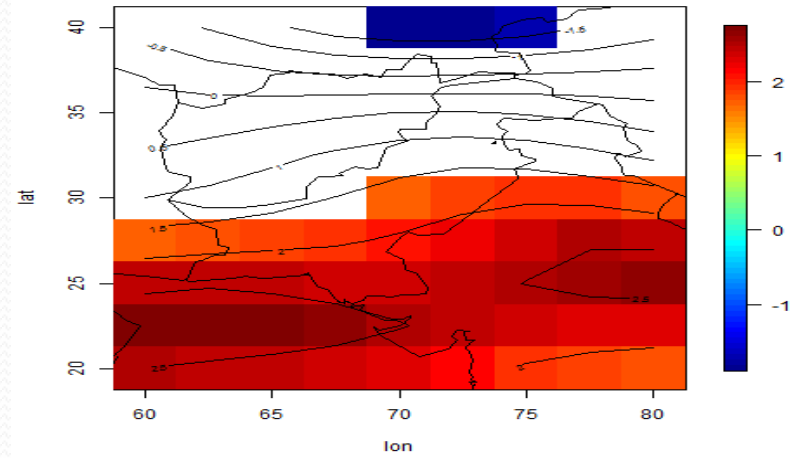


U200(JJA)

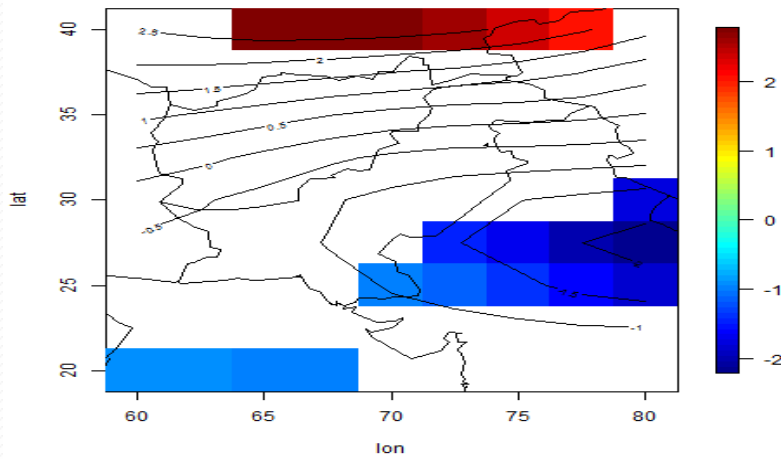
LS Coefficients for CLIM



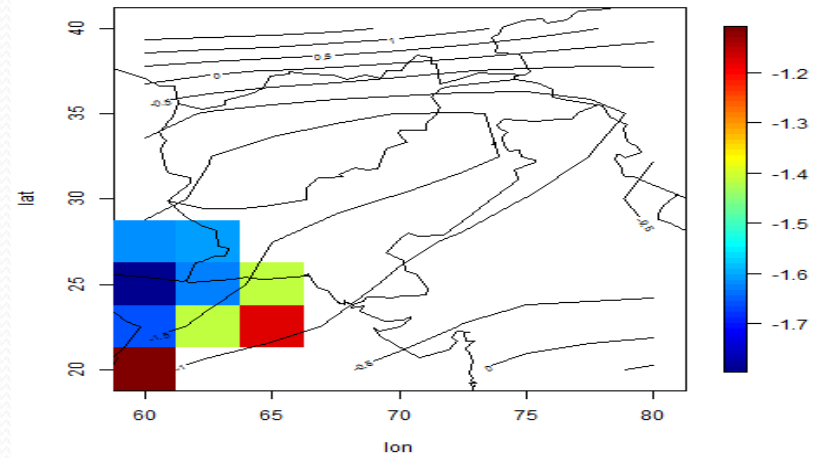
LS Coefficients for N34



LS Coefficients for EMI

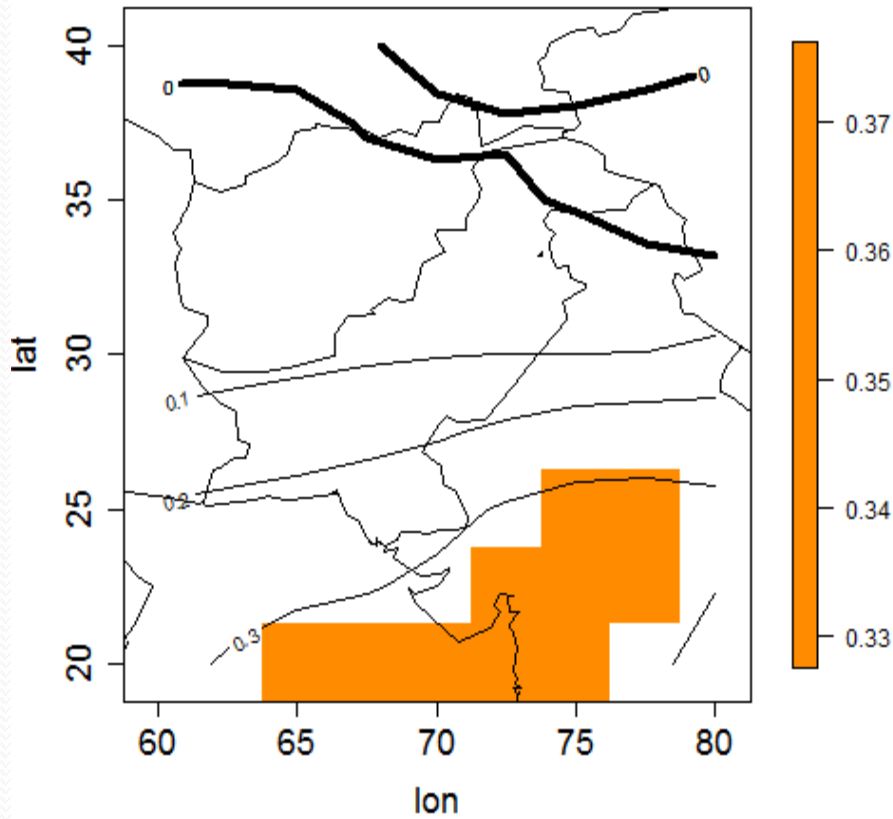


LS Coefficients for DMI



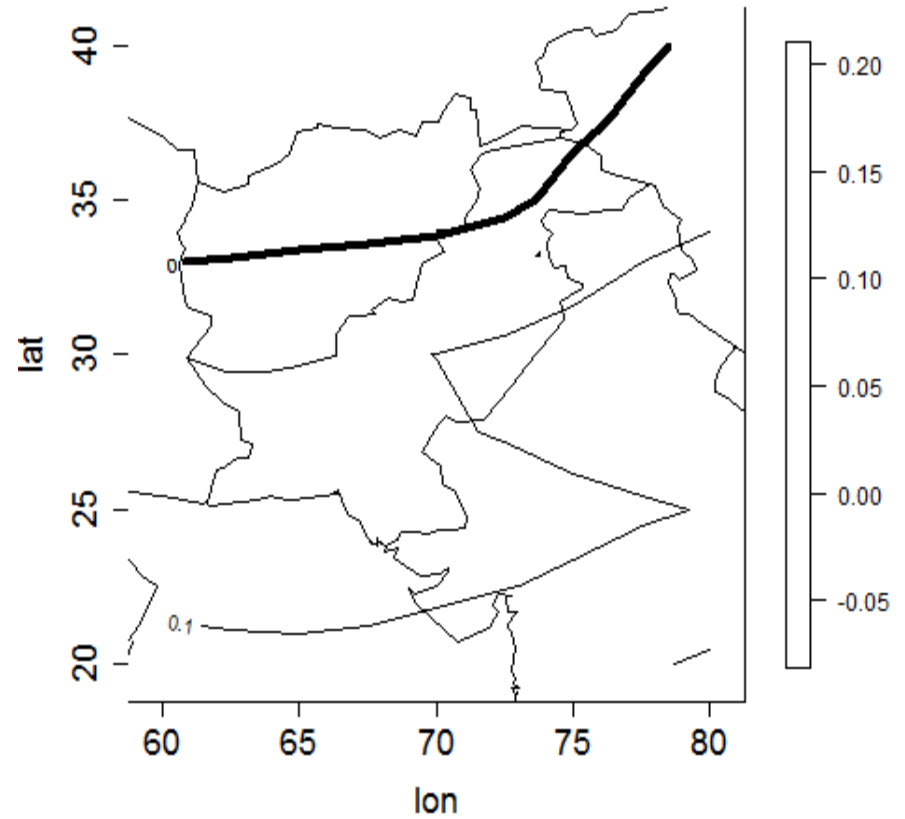
U200(JJA)

Skill with GCM: 0.132



U200(DJF)

Skill with GCM: 0.051





Thanks