

VERTICAL VELOCITY ANALYSIS IN TURKEY

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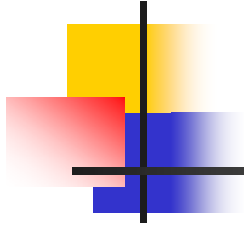
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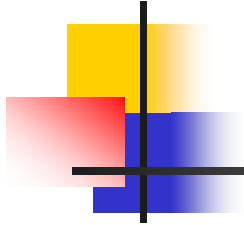
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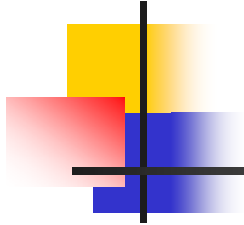
The main aim of this study is to analyze temporal and spatial variations of vertical velocity in Turkey.

Daily programs of gliding activities are based on convection potential in flight area. Vertical velocity, vegetation cover, daily heating rate, instability condition and heat fluxes have a key role on prediction of flight lengths. The favorable gliding conditions are available in late spring, summer and early autumn in Turkey. In this study, NCAR-NCEP re-analysis data (00:00-GMT) are considered. Vertical velocity variables at three different layers (1000 hPa, 925 hPa and 850 hPa pressure levels) have been evaluated at 50X50 km grid points in Turkey. Spatial and temporal variations of vertical velocity variables in May and August have been discussed.



INTRODUCTION

In a stable atmosphere, a lifted parcel of air will be colder and heavier than the air surrounding. It will sink back to its original position, in stable layers, Ahrens, (1999). Stable air tends to resist upward vertical motion. A stable atmosphere may be caused by either cooling the surface air, warming the air aloft or by sinking, OSTIV, (1993). In an unstable atmosphere, a lifted parcel of air will be warmer and lighter than the air surrounding it at each level. It will rise upward away from its original position.



STUDY AREA

Turkey is located in northern hemisphere between 36°- 42° northern parallel and 26°- 45° eastern meridian. It borders the Black Sea, Mediterranean, Marmara and Aegean Sea.

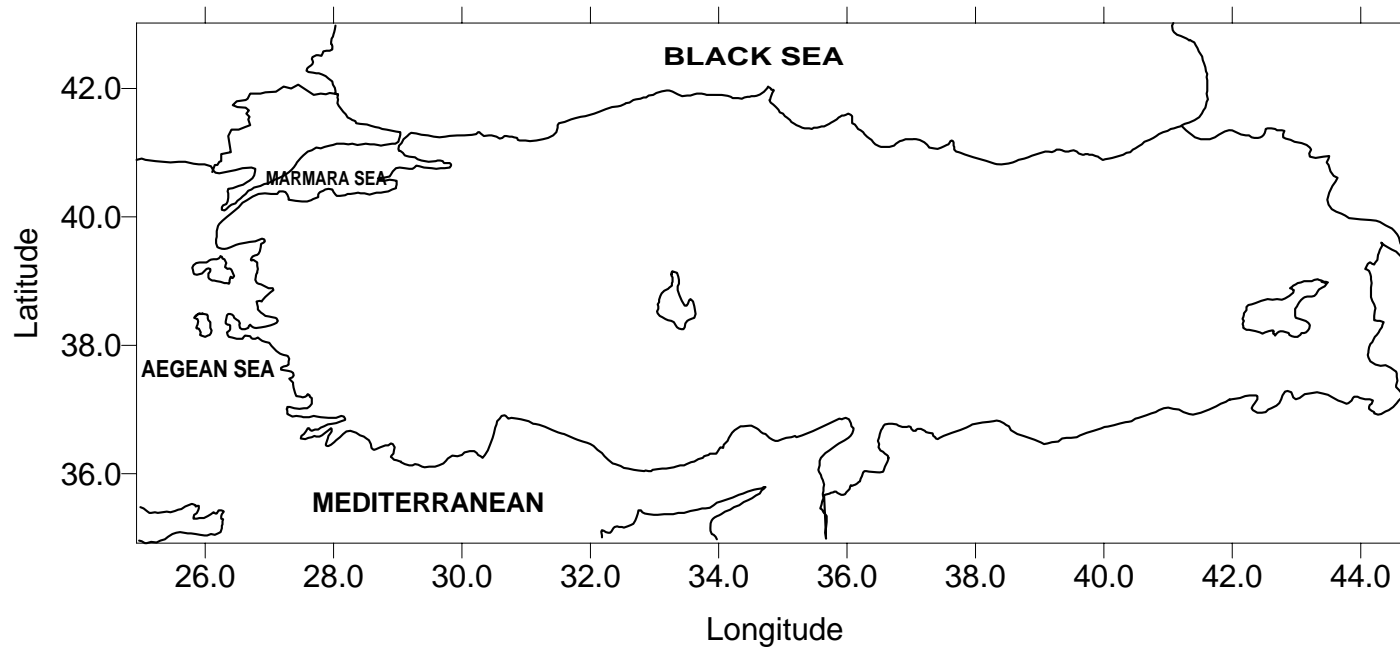
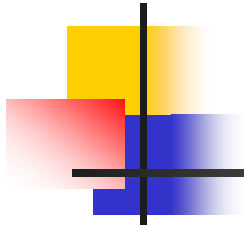


Figure 1. Study area



DATA

In this study, NCAR-NCEP re-analysis data have been used.

Some details on data have been presented in the following table:
Data periods, pressure variation and potential temperature.

Table- Data details

Month	Level	Parameters
Monthly mean value for May Case Study: 22 May 2000	1000 hPa	Pressure variation (Pa/sn.)
Monthly mean value for August Case Study: 9 August 2000	925 hPa 850 hPa	Potential temperature (°K)



ANALYSIS OF POTENTIAL TEMPERATURE AND PRESSURE VARIATIONS

Analysis of Monthly Data in May: The following figure shows spatial variation of monthly mean potential temperature at three level. A case study for a given day is presented.

The following figure shows spatial variation of month values. Higher values have been observed in Eastern and Northeastern Anatolia.

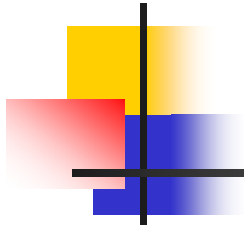
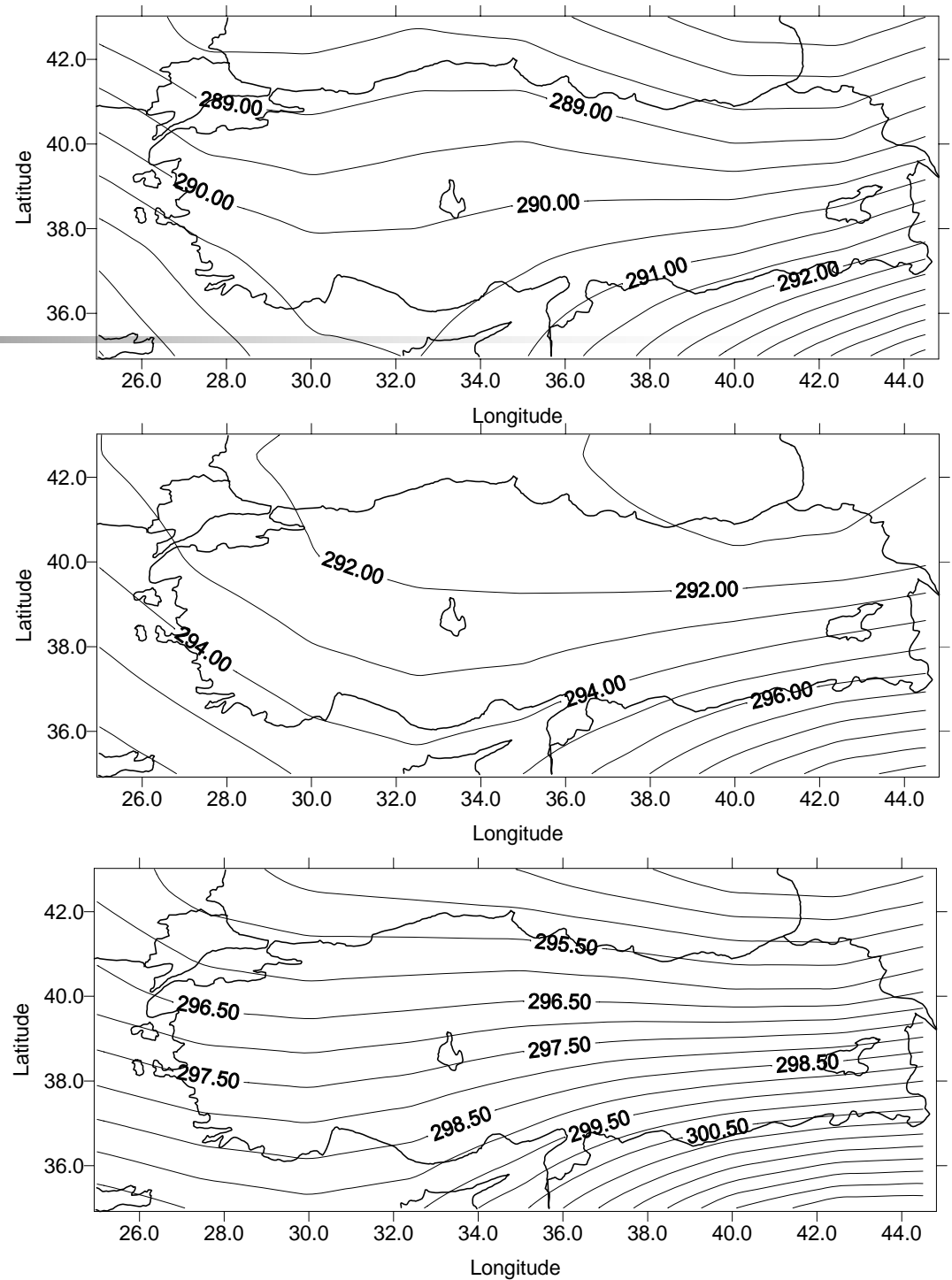


Figure 2. Spatial variation of mean monthly potential temperature at three layer (1000 hPa, 925 hPa and 850 hPa), May 2000.



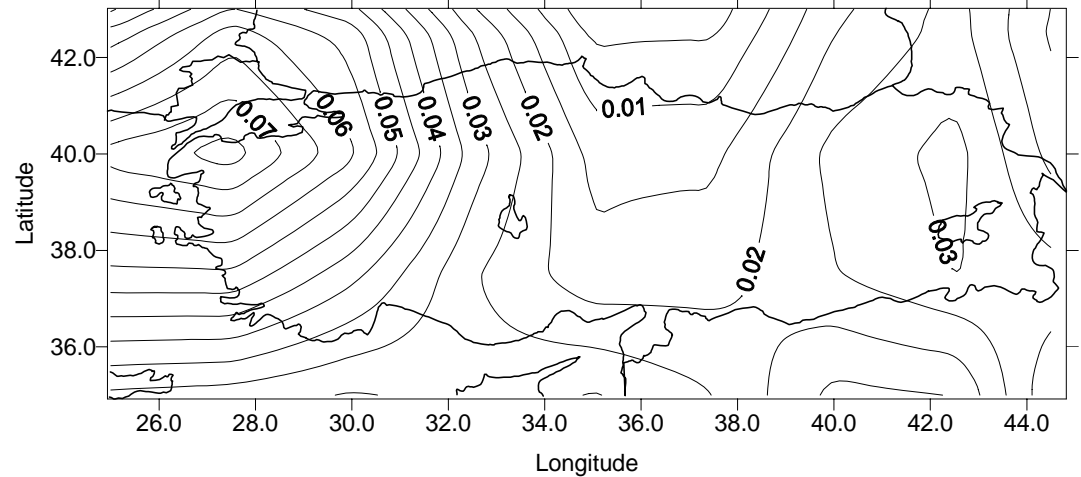
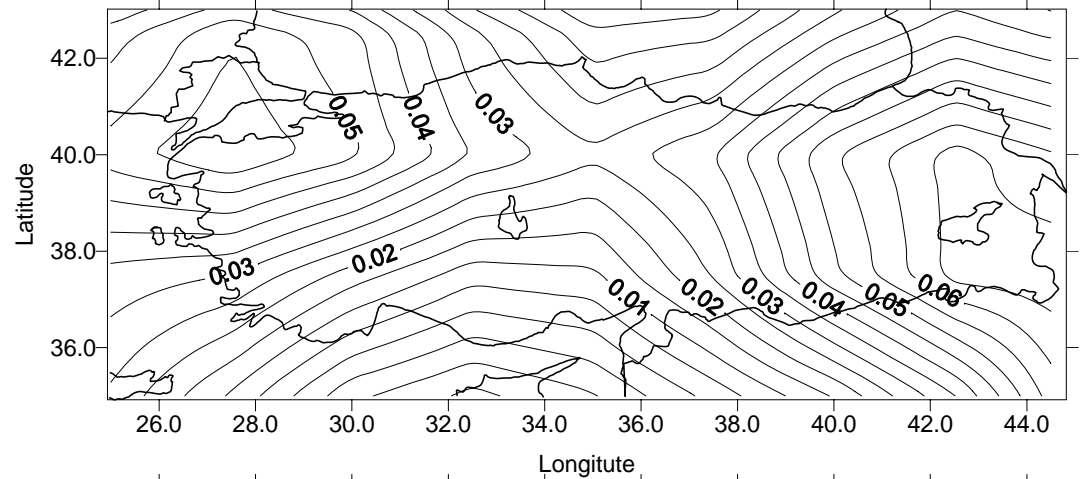
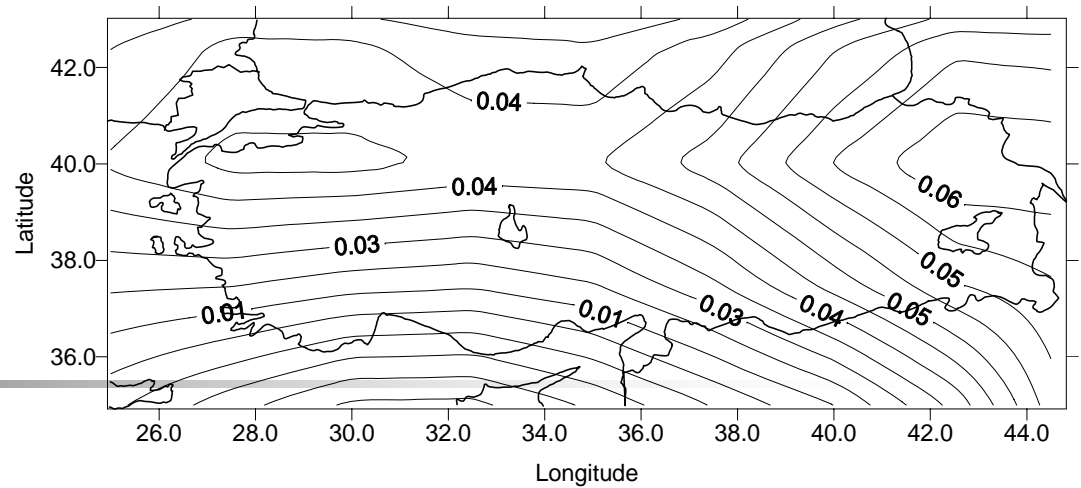
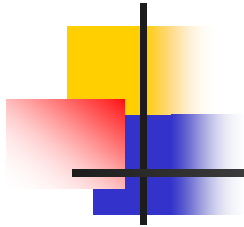
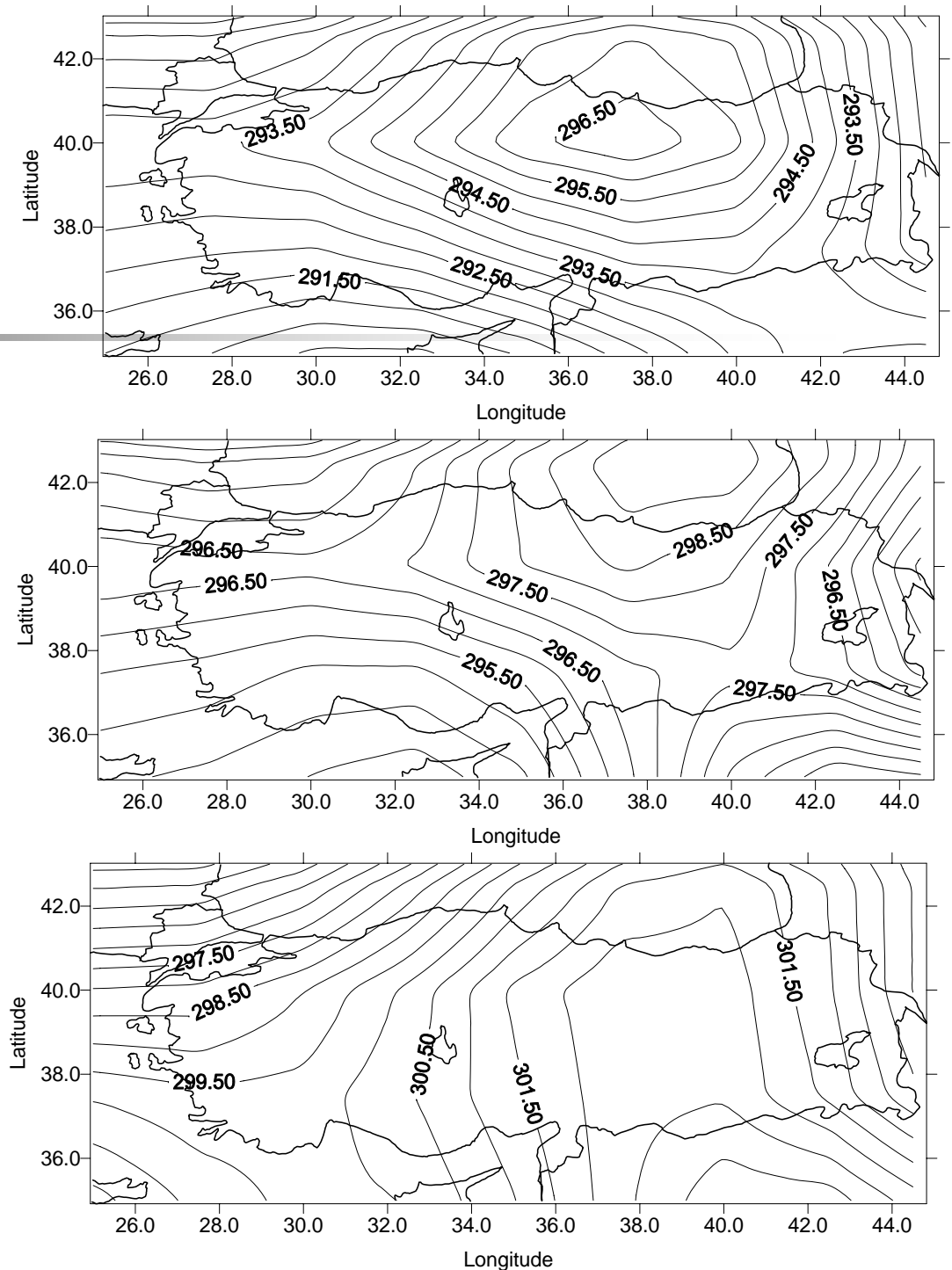


Figure 3. Spatial variation of mean monthly pressure tendency at three layer (1000 hPa, 925 hPa and 850 hPa), May 2000.

Figure 4. Spatial variation of potential temperature at three layer (1000 hPa, 925 hPa and 850 hPa), 22nd May 2000.



For a case a study (on 22nd. May, 2000); pressure and potential temperature variations have been analyzed. The higher potential temperature values are observed in the southern part of Turkey. Increasing potential temperature values are accompanied by decreasing values of pressure variation.



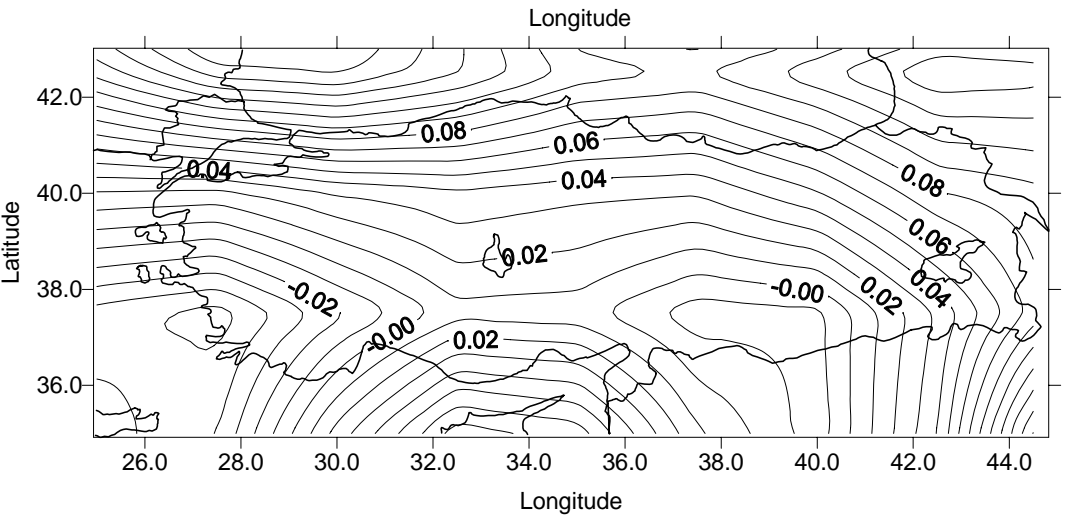
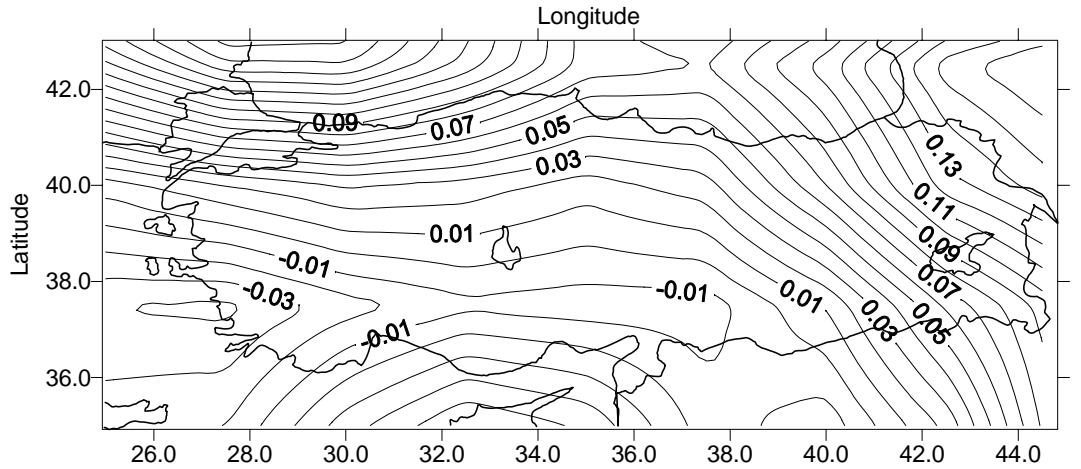
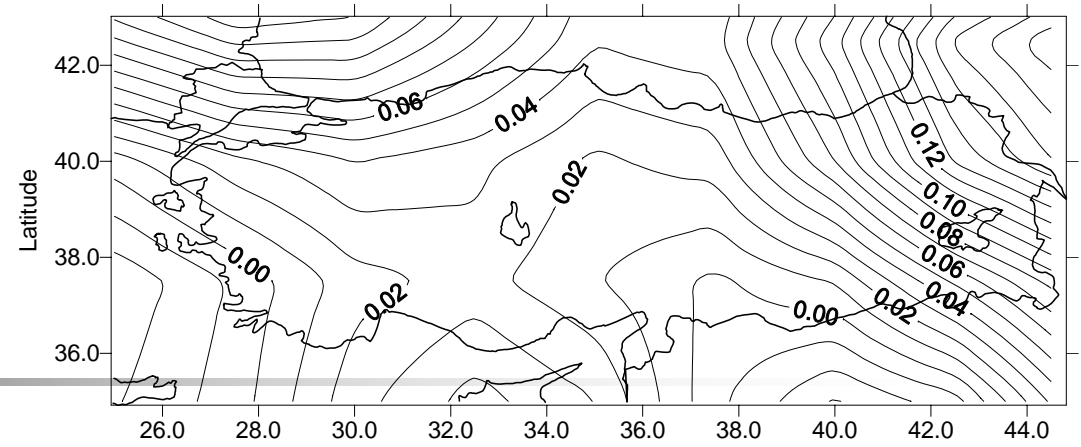
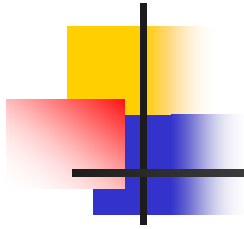
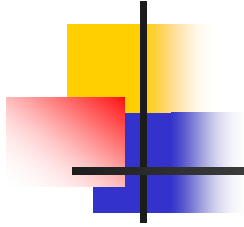


Figure 5. Spatial variation of pressure tendency at three layer (1000 hPa, 925 hPa and 850 hPa), 22nd May 2000.



Analysis of Monthly Data in August: Potential temperature values have increased at the southern part of Turkey. Highest values are observed in the southern and western part of Turkey. Higher vertical velocity values have been observed in Eastern and Western Anatolia. But the lower values have been recorded in Northern and Southern coastal area.

Case Study: Eastern Turkey has higher pressure tendency values. Negative values have been observed on pressure variations over Southern Anatolia.

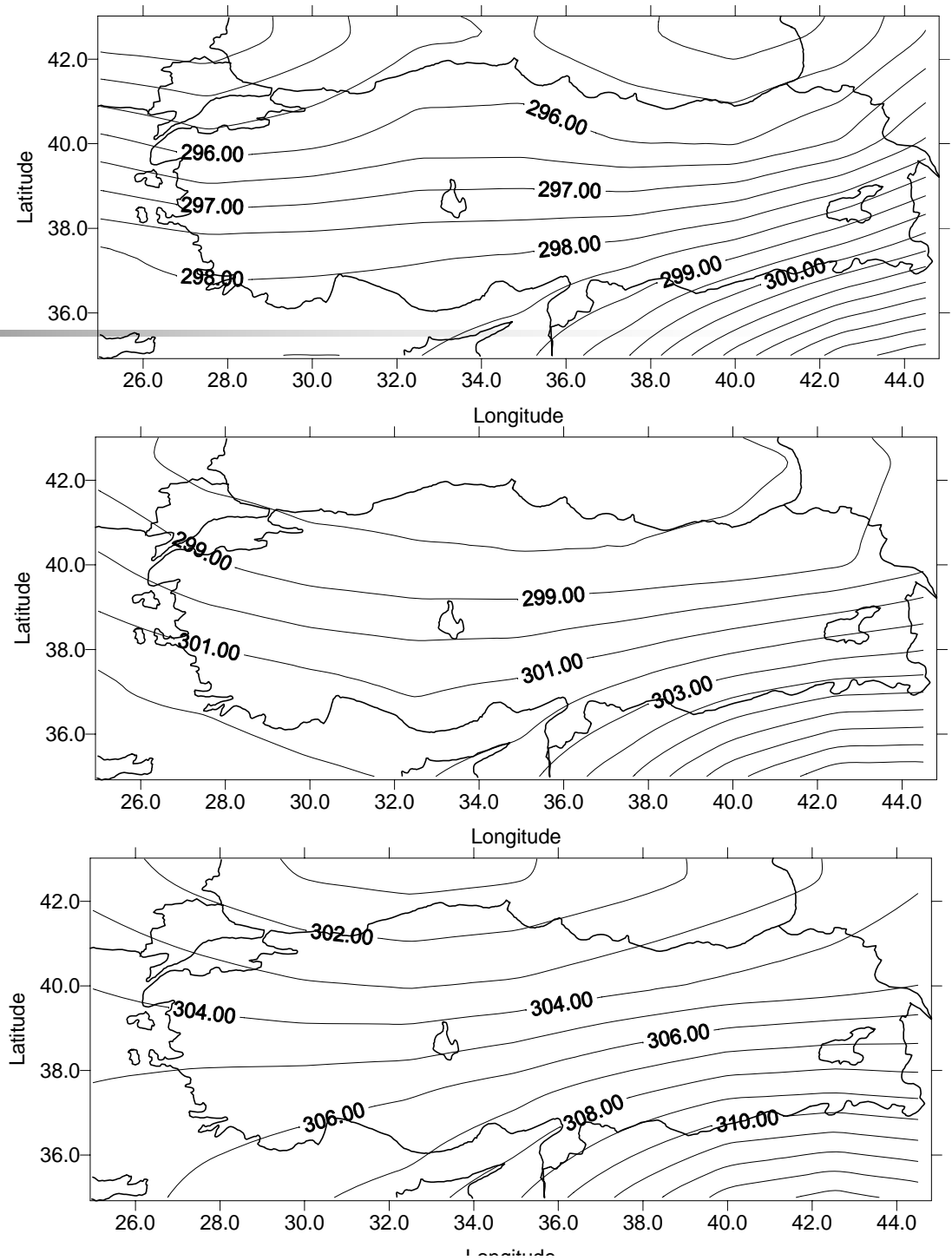
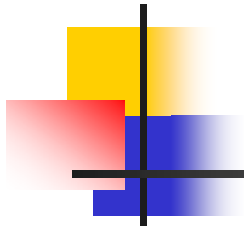


Figure 6. Spatial variation of mean monthly potential temperature at three layer (1000 hPa, 925 hPa and 850 hPa), August 2000.

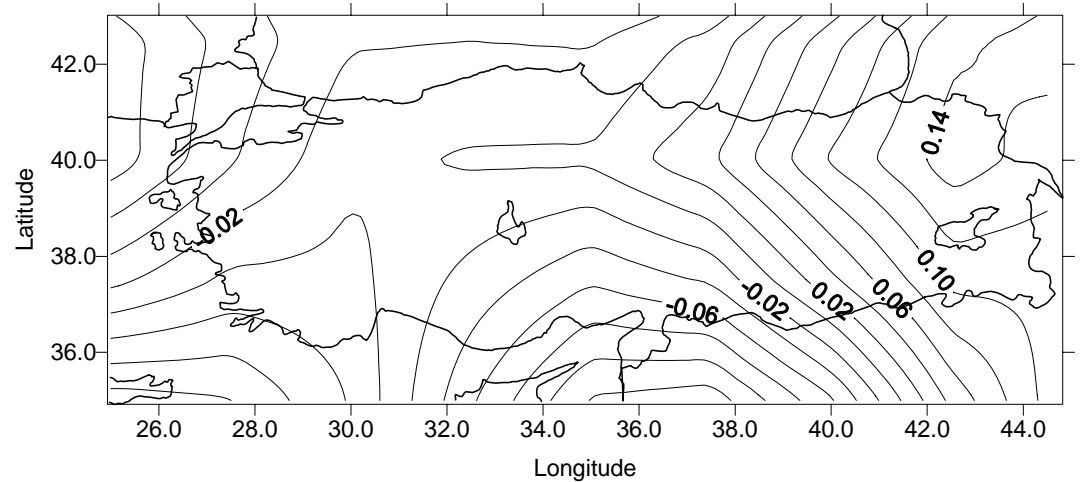
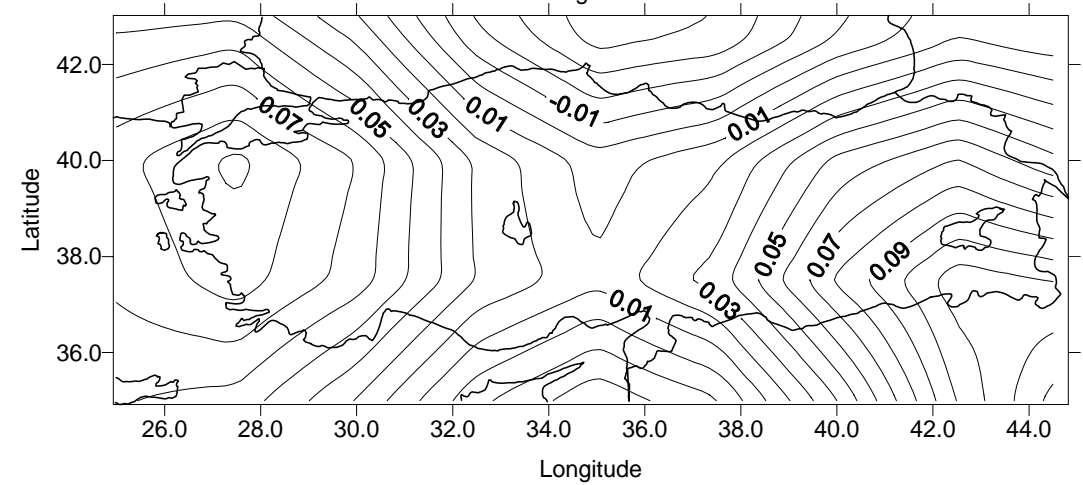
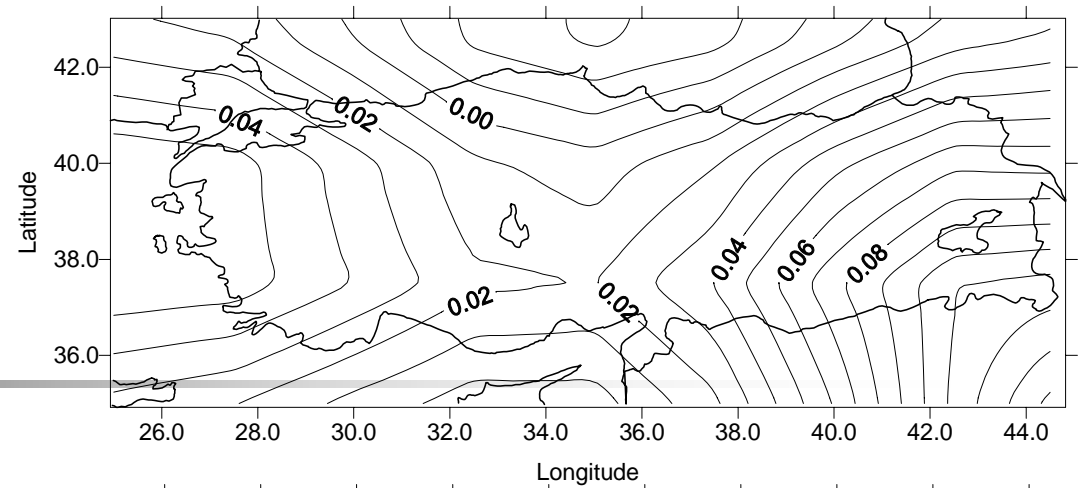
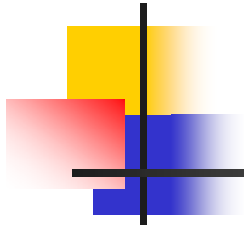
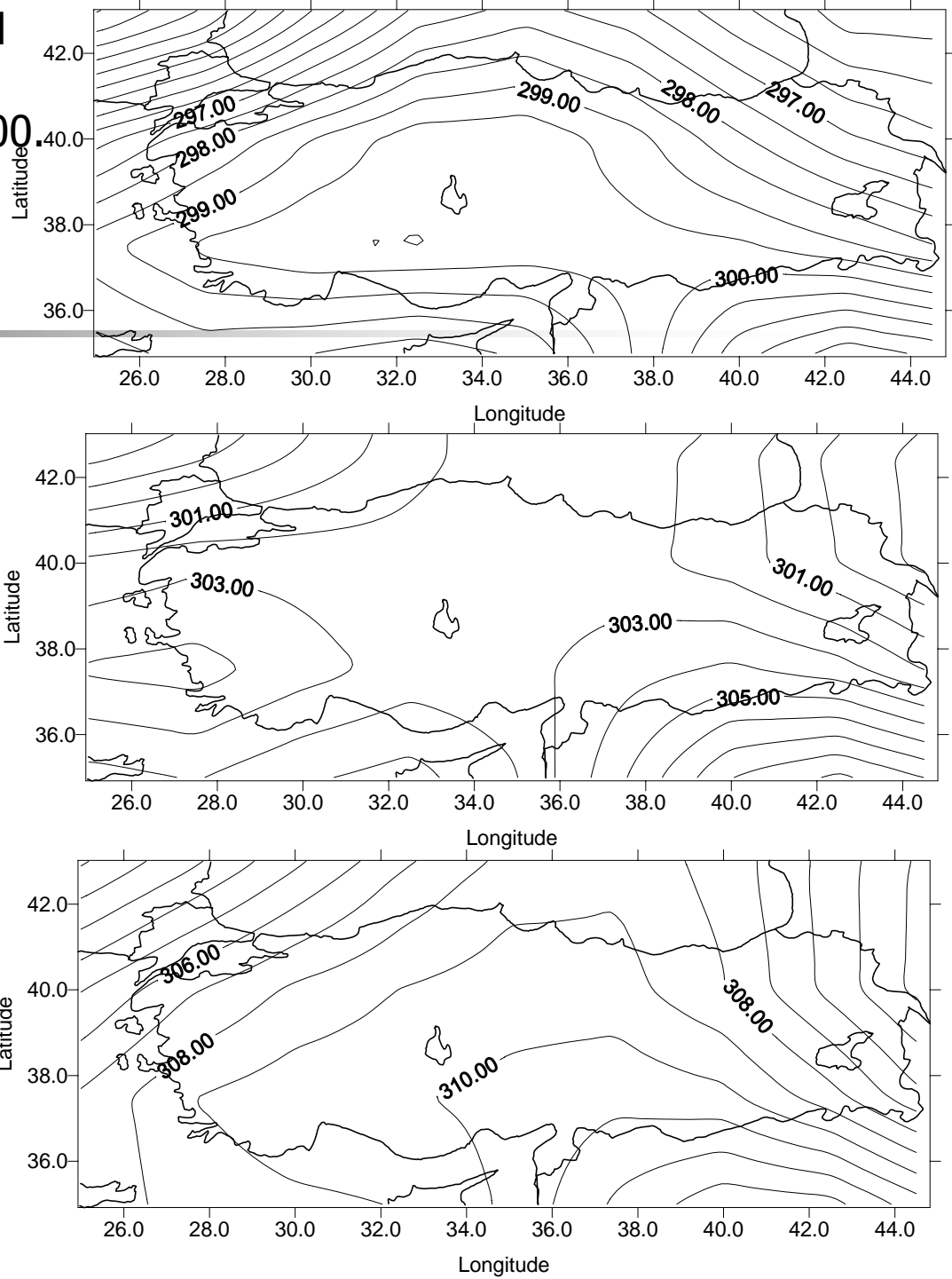
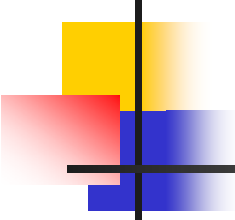


Figure 7. Spatial variation of mean monthly pressure tendency at three layer (1000 hPa, 925 hPa and 850 hPa), August 2000.

Figure 8. Spatial variation of potential temperature at three layer (1000 hPa, 925 hPa and 850 hPa), 9th August 2000.



Eastern Turkey has higher pressure tendency values. Negative values have been observed in pressure variations over Southern Anatolia.

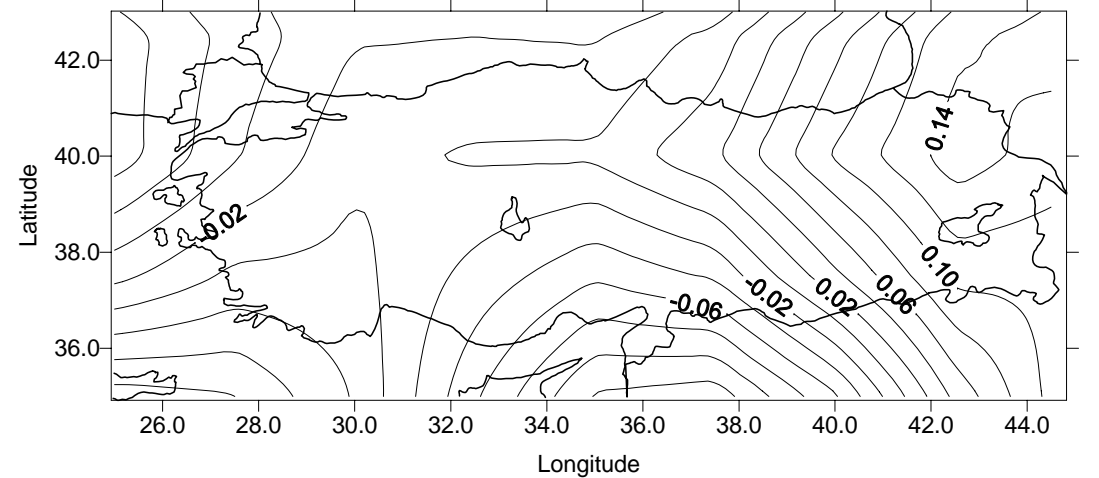
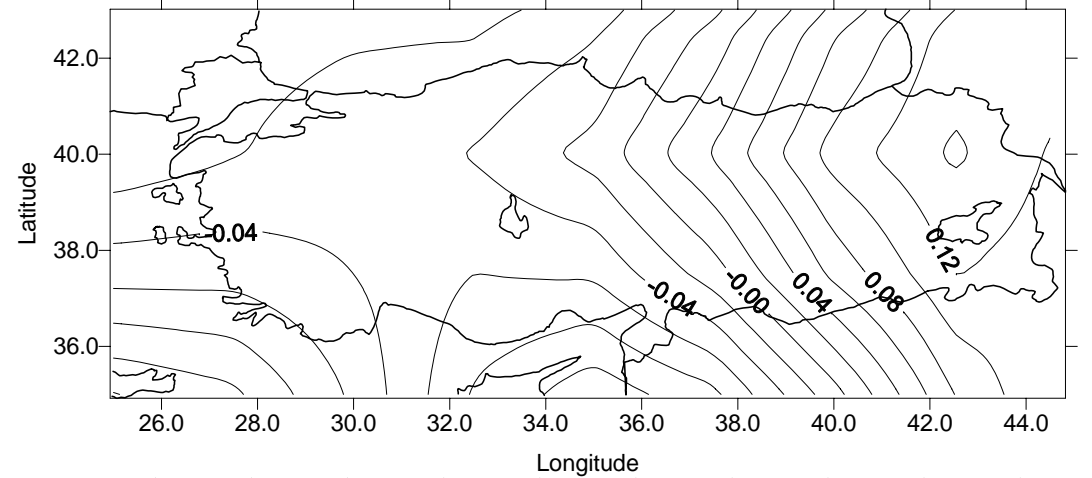
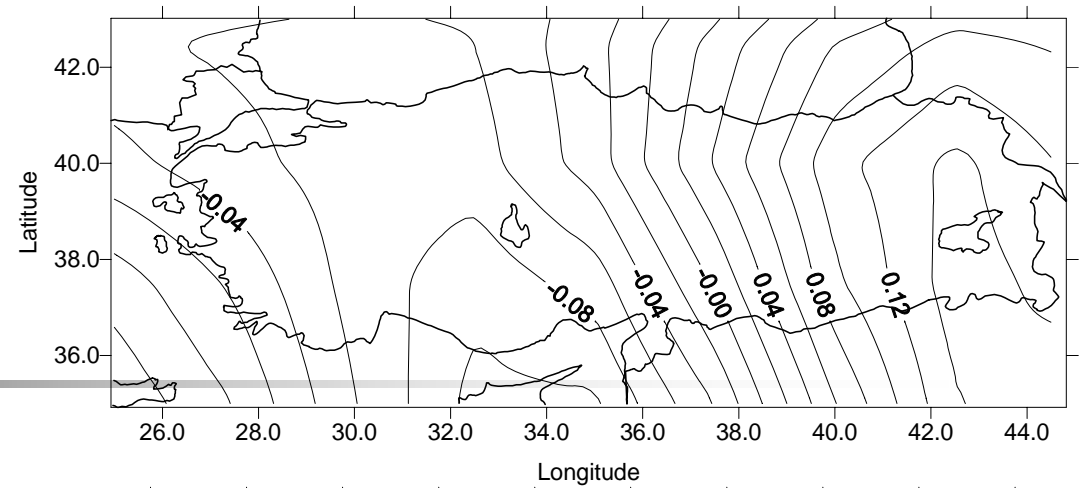
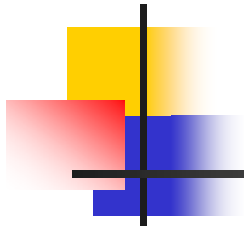


Figure 9. Spatial variation of pressure tendency at three layer (1000 hPa, 925 hPa and 850 hPa), 9th August 2000.

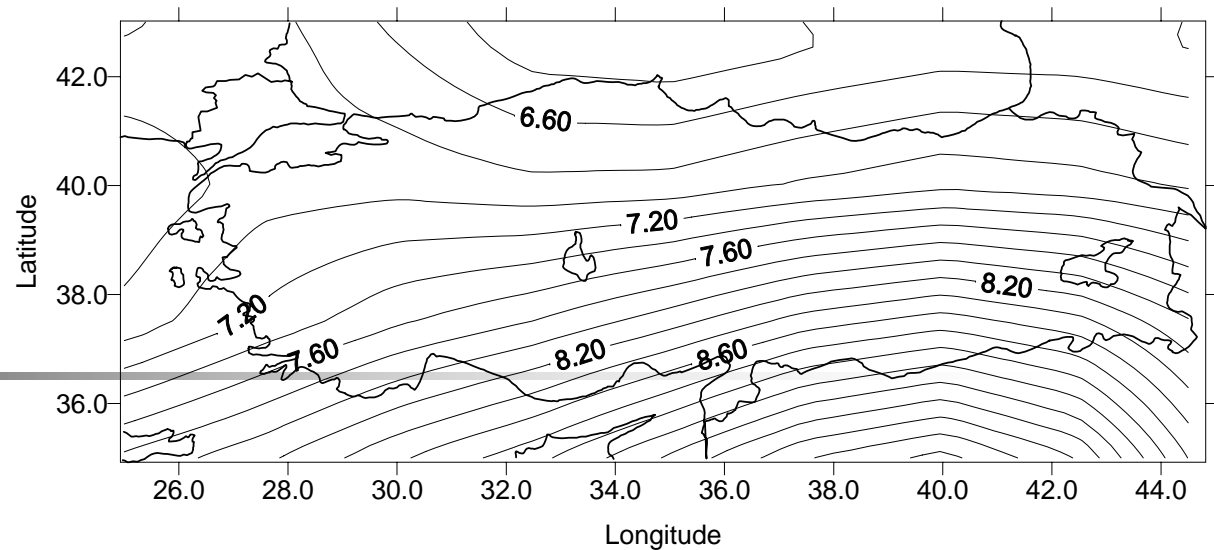
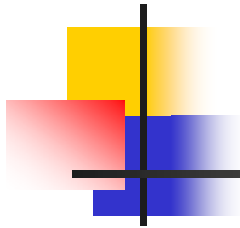


Figure 10. Spatial variation of mean monthly $\Delta\theta$ (1000hPa-850hPa), May 2006.

Thermic potential of study area shows favorable conditions for soaring all over Turkey in August. In May, average thickness values explain the best conditions are available in the Eastern and Southern Anatolia.

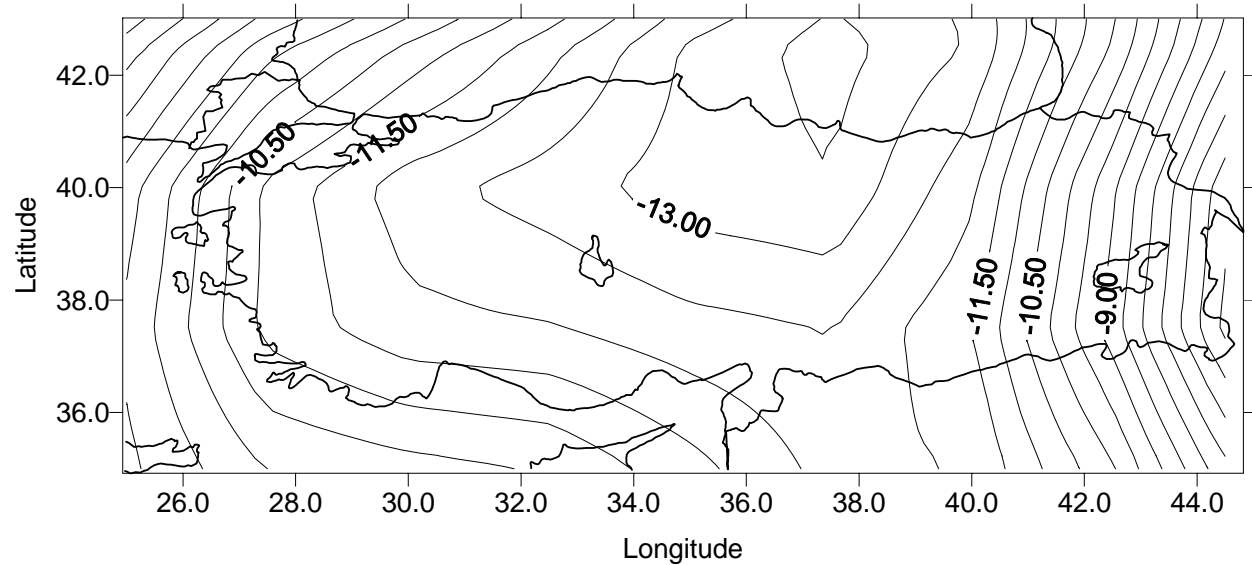
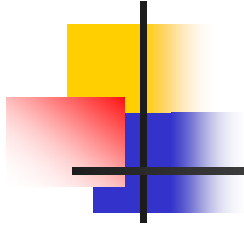
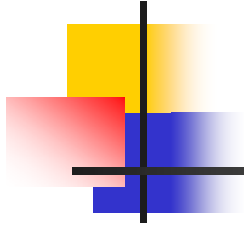


Figure 11. Spatial variation of mean monthly $\Delta\theta$ (1000hPa-850hPa), August 2006



RESULT

The vertical profile of atmospheric parameters within the 1500km above mean sea level is analyzed for soaring activities. It is expected that the results of this study based on NCAR-NCEP re-analyzed data would be useful for the pilot to locate thermals.



REFERENCES

Ahrens, C. N, (1999): Meteorology today, pressure, Sixth Edition, Brooks/Cole.

DLR, (1993): XXIII OSTIV Congress, 1997, Sweden, 17-24 May.