

# A Potential 4+ Class IR Telescope in East Anatolia, Turkey

C.Yeşilyaprak<sup>1</sup>, S.K.Yerli<sup>2</sup>, N.Aksaker<sup>3</sup>, A.Esendemir<sup>2</sup>, S.Özdemir<sup>4</sup>, T.Akkuş<sup>1</sup>, H.Demirci<sup>1</sup>, E.Şakar<sup>1</sup>, Y.Güney<sup>1</sup>, E.Dikicioğlu<sup>1</sup>, Y.Şahin<sup>1</sup>, M.Helvaci<sup>5</sup>, T.Özişik<sup>6</sup>, B.B.Güçsav<sup>4</sup>, B.Dinçel<sup>2</sup>, N.Uzun<sup>2</sup>, D.Çoker<sup>4</sup>, E.Aydın<sup>4</sup>

<sup>1</sup>Atatürk Üniversitesi, Science Faculty, Physics Department, Erzurum; <sup>2</sup>Orta Doğu Teknik Üniversitesi, Physics Department, Ankara;

<sup>3</sup>Technical Science Vocational School, Çukurova Üniversitesi, Adana. <sup>4</sup>Ankara Üniversitesi, Astronomy and Space Science Department, Ankara;

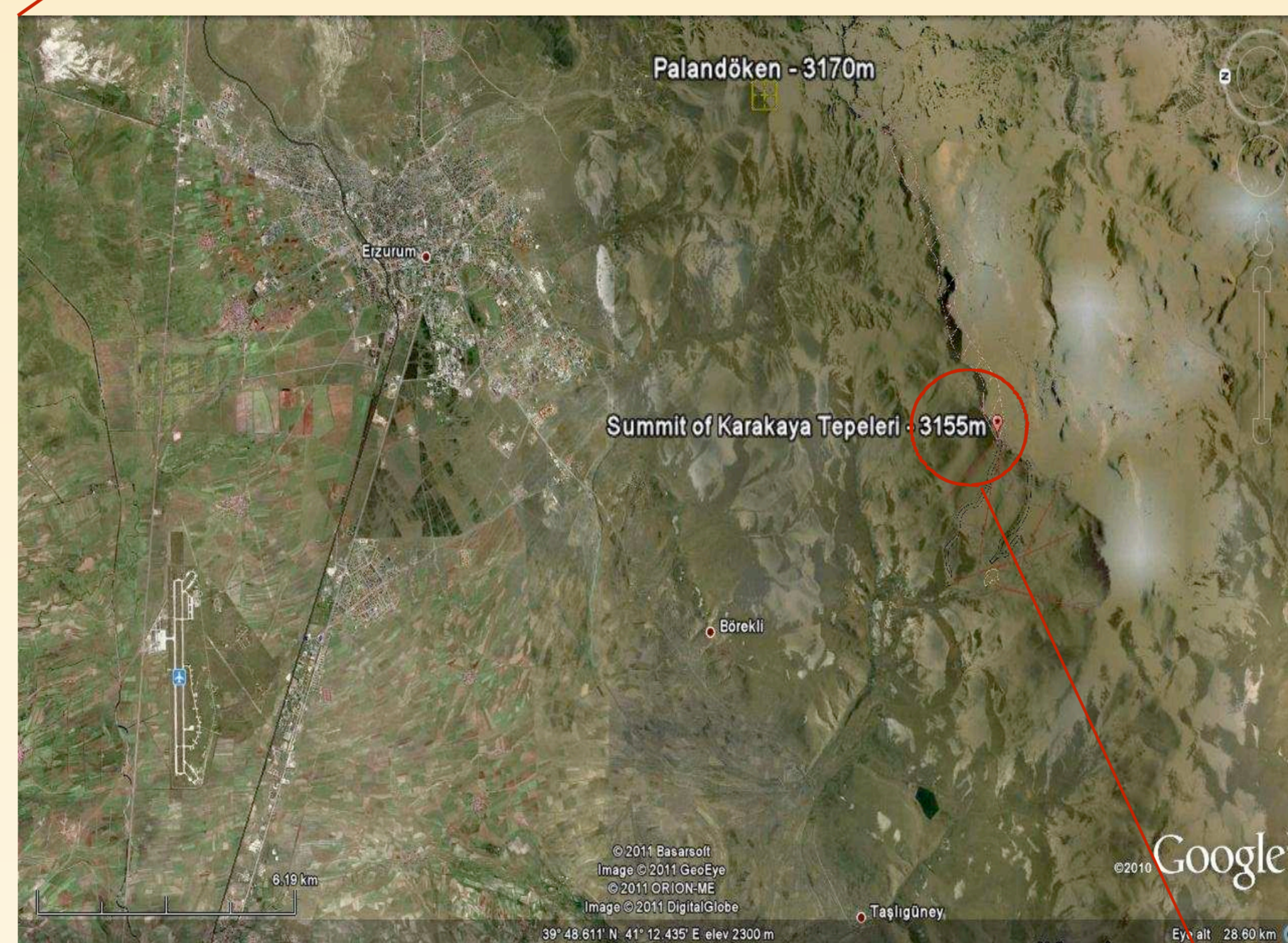
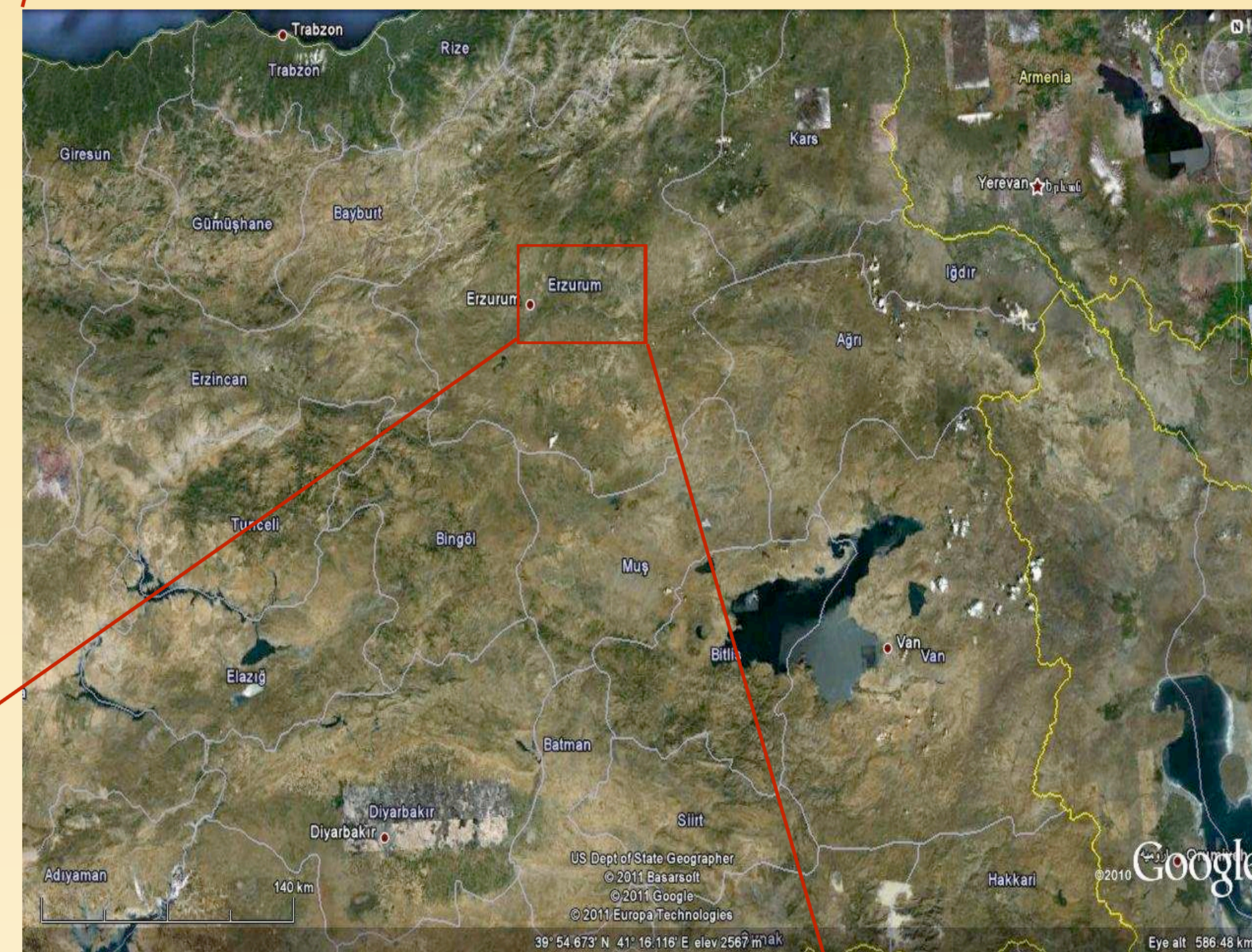
<sup>5</sup>Akdeniz Üniversitesi, Space Science and Technologies Department, Antalya; <sup>6</sup>TÜBİTAK National Observatory, Antalya.

## Abstract:

By interpreting the results of preliminary meteorological measurements carried out since 2008, Karakaya Tepeleri (Erzurum, Turkey) at an altitude of around 3170 m was chosen to be a site for IR observations. The most promising meteorological parameters that promote the site's chance in IR observations were minimum humidity (1-3%), min humidity night count (approximately 5-10 days/year) and mean wind speed (approximately 2.3 m/s for the last 3 years). In addition to these numbers, average clear night counts for the last 3 years were 288 (2008), 267 (2009) and 297 (2010). Inversion layer which was calculated via meteorological balloon (launched twice per day; noon and midnight) measurements is around 2100-2500m (depending on the seasons).

Geographically, the site is covered with high East, North and South mountain ranges which make the site well hidden in a high altitude plateau (Erzurum plateau) preventing from sudden weather activity occurring in North (colder Black Sea region) and South (hotter Middle East and Mediterranean Sea). A short-term DIMM observation (12 days in total with different atmospheric conditions from severe to steady) gave the minimum and median seeing values as 0.45 and 1.06 arcsec, respectively. Extended and detailed meteorological and astronomical observations are also planned during 2011. The site also has all necessary infrastructure facilities to have an observatory: road, ropeway to the summit, water, electricity and communication.

The Karakaya Tepeleri has about 6km long land area suitable to occupy many observatories which will share the same meteorological conditions. This opportunity is open to all potential collaborations around the world.



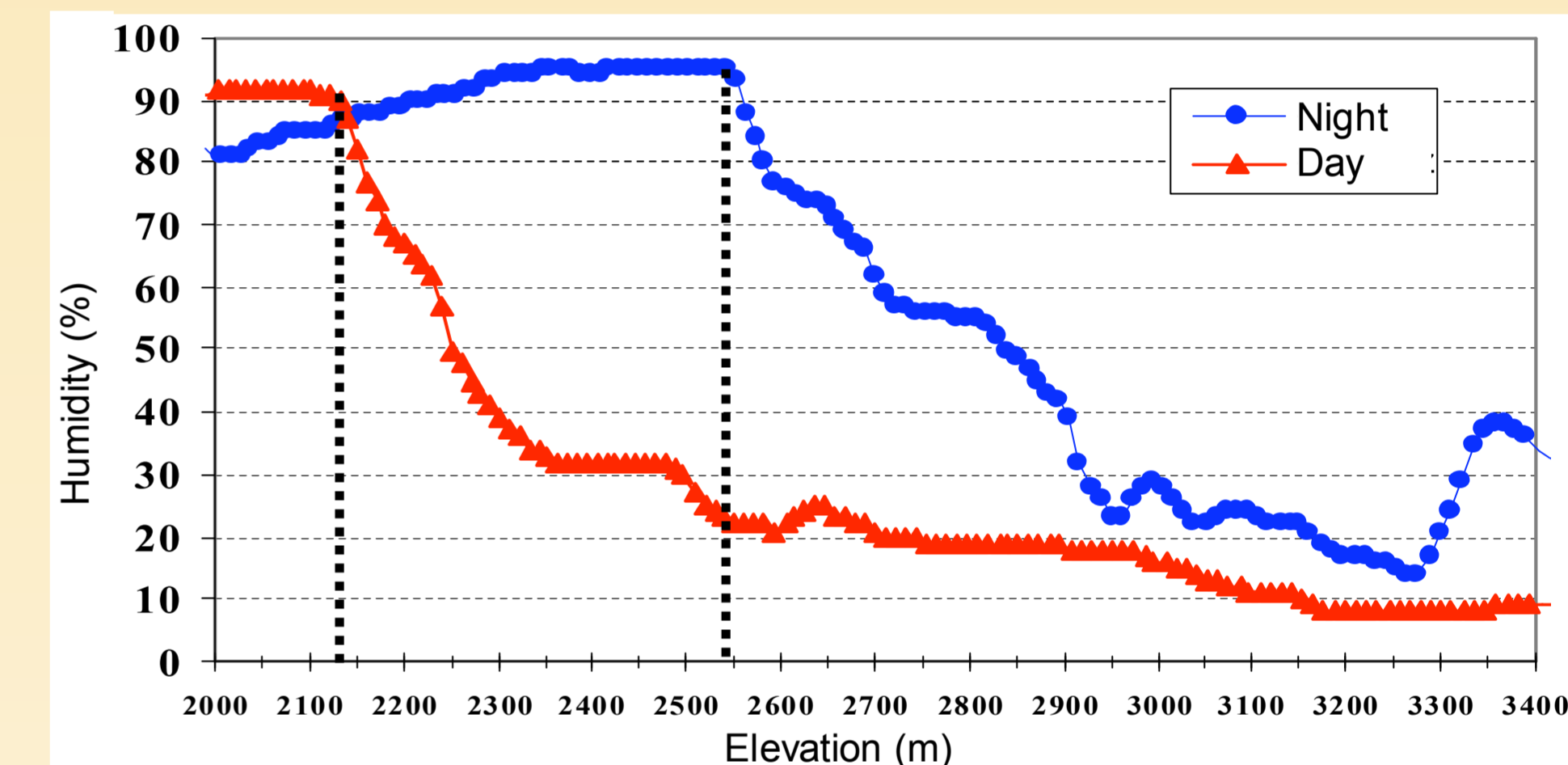
## Wind Speed (m/s)

		V <sub>max</sub>	V <sub>av</sub>	PW <sub>av</sub>	PW <sub>med</sub>
2008	Jan-Feb-Mar	17.9	2.7	3.7	0.9
	Apr-May-Jun	21.0	3.2	4.9	0.4
	Jul-Aug-Sep	13.0	2.8	3.0	0.4
	Oct-Nov-Dec	13.4	1.7	1.9	0.4
2009	Jan-Feb-Mar	13.9	2.2	2.9	0.4
	Apr-May-Jun	19.2	2.1	3.5	3.1
	Jul-Aug-Sep	13.0	2.5	2.4	0.4
	Oct-Nov-Dec	14.3	1.4	2.2	0.4
2010	Jan-Feb-Mar	14.8	1.6	2.3	0.4
	Apr-May-Jun	22.4	2.0	2.7	0.4
	Jul-Aug-Sep	14.3	2.9	3.3	0.4
	Oct-Nov-Dec	18.8	2.0	2.4	0.4

Prevailing Wind Direction: due South.

V<sub>max</sub>: Maximum wind speed measured during the period; V<sub>av</sub>: Average wind speed during the period; PW<sub>av</sub>: Average prevailing wind speed; PW<sub>med</sub>: Median value of wind

## Inversion Layer (m)



Data: around 50 days; Method: Radiosonde; Variation: 2050-2950m; Average: 2500m.

## Clear Day/Night Counts

	Night			Day		
	2008	2009	2010	2008	2009	2010
Jan	24	26	21	24	23	20
Feb	20	15	23	20	13	22
Mar	22	17	20	16	16	25
Apr	20	20	22	7	20	19
May	21	20	24	15	21	23
Jun	28	19	29	26	18	28
Jul	30	22	29	28	22	29
Aug	28	29	29	23	29	29
Sep	26	25	27	21	22	28
Oct	22	27	21	20	23	19
Nov	25	25	29	26	24	28
Dec	22	22	24	20	22	21
<b>Total</b>	<b>288</b>	<b>267</b>	<b>297</b>	<b>246</b>	<b>253</b>	<b>291</b>

## Humidity (%)

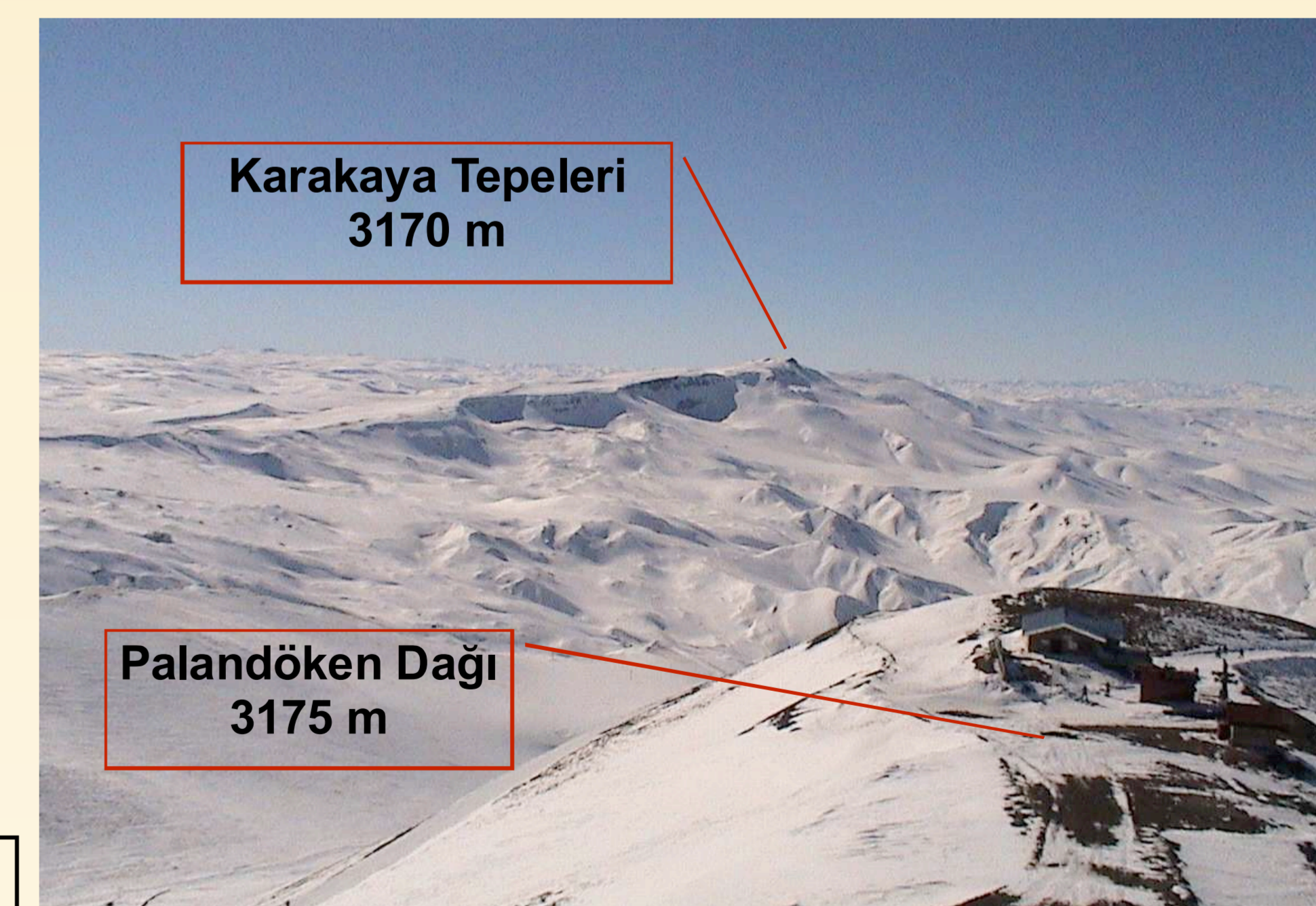
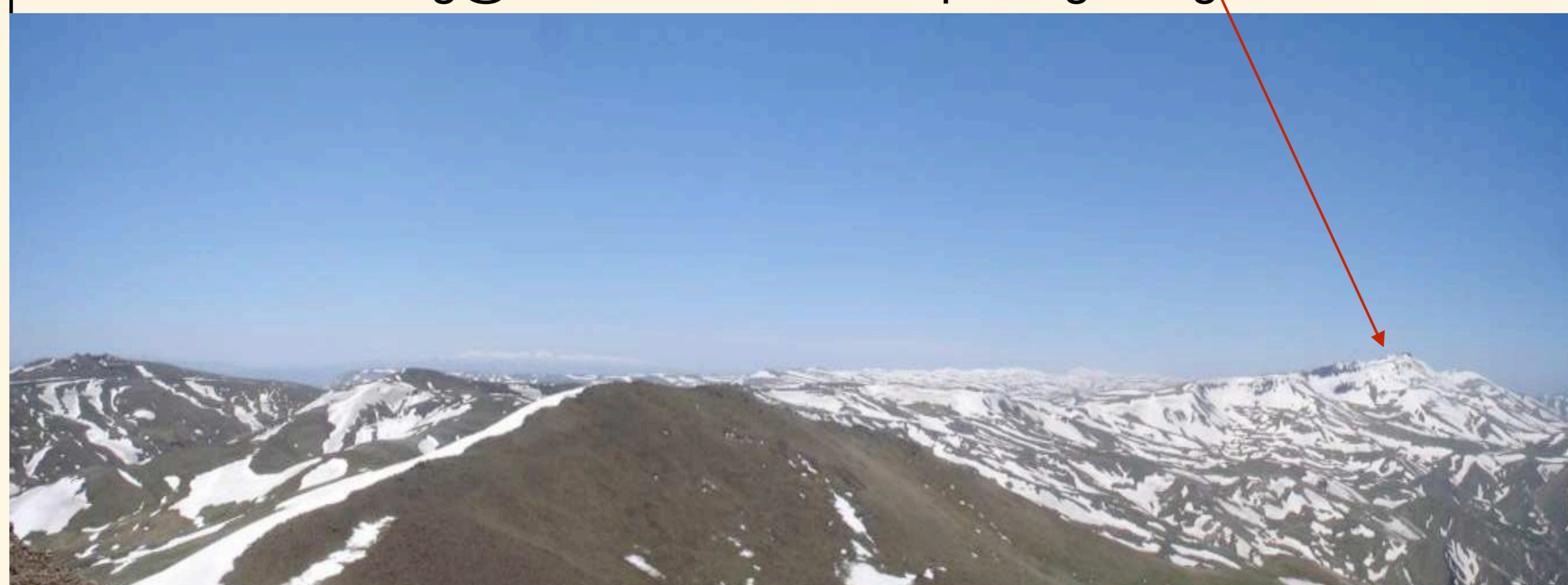
		Radyosonde		Palandöken Dağı	
		HMIN	HMIN	H10	H80
2008	Jan-Feb-Mar	3	4	9	227
	Apr-May-Jun	3	12	0	
	Jul-Aug-Sep	23	11	0	
	Oct-Nov-Dec	8	11	0	
2009	Jan-Feb-Mar	1	2	11	187
	Apr-May-Jun	3	8	1	
	Jul-Aug-Sep	8	2	2	
	Oct-Nov-Dec	-	5	3	
2010	Jan-Feb-Mar	1	4	3	267
	Apr-May-Jun	5	18	0	
	Jul-Aug-Sep	19	12	0	
	Oct-Nov-Dec	6	4	7	

**Radyosonde:** It is launched twice per day (noon and midnight);  
**HMIN:** Minimum humidity value reached during the period.  
**H10:** Number of nights that the humidity was below 10%.  
**H80:** Total number of nights during the year that the humidity was below 80%.

## Karakaya Tepeleri - 6 km long mountain range

39° 47'N - 41° 14'E

dag@atauni.edu.tr — <http://dag-tr.org/>



## Acknowledgement:

The East Anatolian Observatory (DAG) is funded by the State Planning Organization (DPT) of Turkey with a grant number 2011K120230 and partially by Atatürk Üniversitesi, Science Faculty, Physics Department with grant numbers BAP-2007/33 and BAP-2008/109. We kindly thank to Turkish State Meteorological Service for the meteorological data they have provided. NA, acknowledges Çukurova Üniversitesi for the grant TBMYO2010-BAP/4.