

**Table 2:** Paleomagnetic data from the Carpathian - Balkan orogenic belt

	Localities/Reference	Coordinates		Observed direction			<i>k</i>	<i>n</i>	Flattening	Rotation	Age constraints (Ma)		Rock Type	
		Lat (°)	Long (°)	<i>I</i> <sub>0</sub> (°)	<i>D</i> <sub>0</sub> (°)	$\alpha_{95}$			$\Delta I$ (°)	$\Delta D$ (°)	Lower limit	Upper		
Dupont-Nivet et al. (2005)														
1	Carpathian bend area, E hinge	45.5	26.7	55.2	349.9	10.0	154.1	3	6.1 ± 8.2	-13.0±14.4	4.7	3.5	Sediments	
2	Carpathian bend area, W hinge													
	(a) Bizdizel	45.1	25.6	56.0	27.0	5.8	90.9	8	4.9±5.0	24.2±8.8	6.6	5.4	Sediments	
	(b) Valea Vacii	45.1	26.4	52.3	44.5	15.1	67.7	3	8.6±12.2	41.7±20.4	6.4	5.6	Sediments	
	Mean	45.1	26.0	55.2	32.0	5.5	69.0	11	5.7 ±4.8	29.2±8.3	6.6	5.4		
3	Eastern Carpathians													
	(a) Milcov	45.8	26.9	39.2	13	10.9	72.6	4	22.4±8.9	10.4±11.6	9.0	6.0	Sediments	
	(b) Rimnicu	45.6	26.8	50.4	359.2	4.5	34.4	30	11.0±4.0	-3.7±6.3	7.0	2.5	Sediments	
	(c) Putna	45.9	26.8	47.9	357.1	5.4	38.9	19	13.7±4.7	-5.8±7.1	9.0	5.2	Sediments	
	Mean	45.8	26.8	48.0	359.8	3.5	32.6	53	12.8±3.2	-3.2±4.9	9.0	2.5		
4	Southern Carpathians (Middle Miocene)													
	(a) Arges	45.2	24.7	39.4	35.8	7.9	26.1	14	20.9±6.7	29.9±8.9	16.4	13.0	Sediments	
	(b) Lower Topolog	45.2	24.5	35.8	39.5	9.1	26.2	11	24.6±7.6	33.6±9.6	16.4	13.0	Sediments	
	(c) Goesti	45.2	24.5	55.3	37.9	9.4	35.6	8	5.0±7.9	32.0±13.8	16.4	13.0	Tuffs	
	Mean	45.2	24.6	42.1	37.5	5.3	23.2	33	18.3±4.8	31.6 ±6.7	16.4	13.0		
5	Southern Carpathians (Latest Miocene-Pliocene)													
	(a) Ilovat	44.8	22.8	53.0	7.7	6.6	344.8	3	7.6±5.6	5.2±9.3	6.2	6.1	Sediments	
	(b) Bengeseti	45.1	23.7	50.2	11.2	20.2	38.4	3	10.6±16.2	8.6±26.2	5.3	4.8	Sediments	
	(c) Badislava	45.2	24.5	50.7	-5.6	4.4	56.7	20	10.3±3.9	-8.3±6.2	6.0	4.4	Sediments	
	(d) Upper Topolog	45.1	24.6	55.4	359.1	7.5	65.6	7	5.5±6.3	-3.6±11.0	5.0	3.0	Sediments	
	Mean	45.0	23.9	50.9	358.0	3.6	50.4	33	9.9 ±3.4	-4.6±5.4	6.2	3.0		
Bazhenov et al. (1993) <sup>1</sup>														
6	Eastern Carpathians													
	(a)	48.2	23.7	29.0	29.0	7.0	41.0	10	30.4 ±7.4	23.3 ±9.7	94.0	65.0	Sediments	
	(b)	48.3	23.5	42.0	52	5.7	15.0	43	17.5 ±6.7	46.3 ±9.5	94.0	65.0	Sediments	
	(c)	48.1	23.9	34.0	18	15.6	13.0	7	25.3 ±13.4	12.4 ±16.8	94.0	65.0	Sediments	
	Mean	48.2	23.8	35.0	33.0	-	-	60	24.4	27.33±12.0	94.0	65.0		
7	Southern Carpathians													
	(a)	45.7	25.9	26.0	65.0	10.2	24.0	2	30.8±9.8	61.8±11.6	65.0	83.0	Sediments	
	(b)	45.4	25.4	43.0	112.0	7.6	116.0	3	13.7 ±8.0	106.9±0.8	65.0	91.0	Sediments	
	(c)	45.2	25.6	48.0	89.0	7.8	27.0	2	6.7 ±7.3	87.4±0.5	65.0	74.0	Sediments	
	Mean	45.4	25.6	39.0	88.7	-	-	7	51.2	85.4	65.0	82.7		
Paniatiou (1998); (1999); (2005); Rosu et al. (2004) <sup>1</sup>														
8	Eastern Carpathians	47.6	23.8	63.0	4.9	2.7	22.4	123	-0.3±5.9	-0.3±3.0	9.0	11.0	Volcanics	
9	Southern Carpathians Apuseni Mountains (Middle Miocene)	45.5	25.3	50.8	72.5	12.6	54.1	3	8.3 ±10.5	63.4±16.7	40.0	55.0	Sediments	
10														
	(a)	46.1	23.0	63.3	350.7	3.6	53.3	30	-1.8±3.6	-14.3±7.3	10.3	12.8	Volcanics	
	(b)	46.1	23.0	60.6	28.2	5.8	52.3	13	0.5±5.1	22.4±0.1	12.3	13.4	Volcanics	
	(c)	46.1	23.0	61.1	63.4	8.3	45.8	8	0.0±7.0	57.6±14.3	13.5	14.7	Volcanics	
	Mean	46.1	23.0	61.7	147.4	-	-	51	0.3	40.0	12.0	13.6		
11	(Cretaceous) Transylvanian Basin	45.9	22.8	42.2	81.8	5.8	18.4	35	15.8±6.9	76.1±9.4	65.0	77.0	Volcanics	
12	(Pleistocene)	46.0	25.4	64.1	3.5	4.3	60.8	19	-2.6±3.9	0.7±8.4	0.6	1.2	Volcanics	
13	(Latest Miocene-Pliocene)	46.4	25.7	61.2	7.2	3.3	37.0	52	0.7±3.2	4.4±6.2	4.0	6.0	Volcanics	
14	(Late Miocene)	46.8	25.1	62.3	359.3	3.9	42.4	31	-0.1±3.7	-5.9±7.5	6.5	8.5	Volcanics	
15	(Middle Miocene)	47.1	23.8	56.7	67.8	8.1	18.6	3	5.2±6.8	61.8±12.4	13.0	15.0	Sediments	
16	(Eocene)													
	(a)	46.7	23.2	38.3	82.3	6.8	128.3	2	21.7±6.6	72.9±8.9	40.0	50.0	Sediments	
	(b)	47.2	23.2	35.9	87.1	9.0	16.8	17	23.3±7.8	80.7±9.9	50.0	55.0	Sediments	
	Mean	46.7	24.4	53.1	101.2	-	-	21	22.5	76.8±8.5	19.0	22.6		
van Hinsbergen et al. (2008)														
	Balkans													
17	(Latest Oligocene-Miocene)	Suihindol	43.2	25.2	64.4	6.1	9.3	25.2	11	7.3	13.3	19.4	24.0	Volcanics
18	(Oligocene)													
	(a) Banichan	41.4	23.4	-57.2	160.5	37.2	7.1	4	35	45.8	28.0	29.0	Volcanics	
	(b) Zvezdel	41.2	25.2	-58.1	194.2	10.4	20.2	11	9.6	13.4	31.0	33.0	Volcanics	
	(c) Yabalkov	42.0	25.2	-73.2	181.5	6.5	45.1	12	4.1	12.7	31.5	35.0	Volcanics	
	Mean	41.5	24.6	-62.8	178.7	-	-	9	16.2	24.0	30.2	32.3		
19	(Paleogene)													
	(a) Bratsigovo	41.2	24.2	-47.4	204.1	21.0	35.4	3	24.9	24.6	36.0	40.0	Volcanics	
	(b) Dospat	41.4	24.1	-47.4	204.0	6.1	72.3	9	7.2	7.1	36.0	40.0	Volcanics	
	Mean	41.3	24.2	-47.4	204.1	-	-	6	16.1	15.9	36.0	40.0		

**Table 2 continued**

Bazhenov & Burtman (1980) <sup>2</sup>														
Eastern Carpathians	(a)	48.0	23.0	42.0	52.0	5.7	15.0	43	-	-	65.5	99.6	Sediments	
	(b)	48.0	23.0	39.0	44.0	5.3	13.0	60	-	-	65.5	99.6	Sediments	
Bazhenov & Burtman (1980) <sup>3</sup>														
East Carpathians	(a)	-	-	42.0	52.0	6.0	-	43	-	-37.0	70.6	93.6	-	
	(b)	-	-	29.0	28.0	7.0	-	10	-	-13.0	70.6	93.6	-	
Bazhenov et al. (1980) <sup>2</sup>														
West Carpathians (Outer )	(a)	49.5	20.5	40.0	333.0	-	-	27	-	-	65.5	96.6	Sediments	
	(b)	49.5	18.0	45.0	268.0	7.7	27.0	12	-	-	-	-	-	
Bazhenov et al. (1980) <sup>3</sup>	(a)	-	-	41.0	278.0	9.0	-	6	-	95.0	70.6	89.3	-	
	(b)	-	-	49.0	256.0	9.0	-	6	-	117.0	70.6	89.3	-	
	(c)	-	-	40.0	333.0	10.0	-	38	-	41.0	Upper Cretaceous	-	-	
Bazhenov et al. (1983) <sup>2,3</sup>														
Balkans, Bulgaria	Gradist and Pesovec	-	-	48.0	346.0	5.0	-	23	-	-28	70.6	85.8	Sediments	
Kotasek et al. (1969) <sup>2</sup>														
Pannonia	W Mecsek	-	-	-18.4	186.9	5.8	14.0	48	-	-	258.0	299.0	-	
Krs et al. (1979)														
West Carpathians	Slanske vrchy Mtns	48.9	21.5	73.5	6.7	7.5	5.4	80	-	-	1.8	12.0	-	
	Vihorlat Mtns	48.8	22.1	59.6	347.4	5.7	2.5	128	-	-	8.0	13.0	-	
	Kremnicke vrchy Mtns	48.7	18.9	60.2	15.3	3.9	4.8	73	-	-	7.3	11.6	-	
	Kremnicke vrchy Mtns	48.6	18.9	57.3	6.5	5.5	4.8	42	-	-	11.6	12.7	-	
	Pohronsky Inovec Mtns	48.4	18.6	55.8	20.4	8.3	10.3	32	-	-	11.6	13.0	-	
	Polana and Javorie Mtns	48.6	19.4	67.3	351.5	2.4	43.2	86	-	-	11.6	13.0	-	
	Stavnicke vrchy Mtns	48.4	18.9	71.9	5.7	3.2	12.6	170	-	-	11.6	13.0	-	
	Vtacnik Mtns	48.6	18.7	63.2	25.3	7.0	9.6	48	-	-	11.6	13.6	-	
	Velky Milic Zepmlinske vrchy Mtns	48.5	21.7	56.4	338.9	8.1	17.8	31	-	-	11.6	15.0	-	
	Velky Milic Zepmlinske vrchy Mtns	48.5	21.8	44.7	340.4	8.1	21.7	19	-	-	15.5	16.5	-	
	Mtns group of Ondrejnik	49.6	18.3	72.6	317.7	4.5	10.9	101	-	-	89.3	99.6	-	
	Choc Nappe	49.0	20.0	19.8	71.8	6.4	4.5	141	-	-	208.0	230.0	-	
	Kosice	48.8	20.5	16.9	29.2	5.3	4.6	195	-	-	245.0	251.0	-	
	Male Karpaty Mtns	48.5	17.3	27.2	264.8	15.9	3.1	57	-	-	251.0	299.0	-	
	Nizke Tarty Mtns	50.0	19.7	-28.7	261.2	11.8	15.9	140	-	-	251.0	299.0	-	
	Tribec	48.5	18.5	-20.7	258.3	10.3	7.7	29	-	-	251.0	299.0	-	
	Filakovo	48.2	19.9	68.3	355.9	3.2	12.6	17	-	-			Tertiary	
West Carpathians (Outer)	(a)	49.5	18.4	46.0	300.3	10.0	3.1	94	-	-	85.8	89.3	-	
	(b)	49.5	18.3	52.7	312.7	3.3	8.8	228	-	-	89.3	99.6	-	
	(c)	49.6	18.1	55.7	15.3	5.6	6.4	116	-	-	125.0	136.4	-	
Krs et al. (1982) <sup>2</sup>														
West Carpathians (Outer)	Dukla Unit	49.2	22.2	-40.1	158.7	3.6	10.0	165	-	-	37.2	33.9	Sediments	
	Dukla Unit	49.5	18.4	46.0	300.3	10.0	3.0	94	-	-	85.5	83.5	Sediments	
	Ondrednik	49.6	18.3	72.6	317.7	4.5	11.0	101	-	-	89.3	99.6	Sediments	
	-	49.5	18.3	52.7	312.7	3.3	9.0	228	-	-	89.3	99.6	Sediments	
	-	59.6	18.1	62.3	298.8	17.5	7.0	116	-	-	125.0	136.4	Plutonics	
	Choc Nappe	49.0	20.0	19.8	71.8	6.4	4.0	141	-	-	251.0	260.4	Sediments	
	NW of Korsice	48.8	20.5	16.9	29.2	5.3	5.0	195	-	-	251.0	299.0	Sediments	
	Little Carpathians	48.5	17.3	-2.3	269.4	18.9	14.0	46	-	-	251.0	299.0	Melaphyres	
	Tribec Mtns	48.5	18.5	18.0	254.8	10.0	8.0	29	-	-	251.0	299.0	Melaphyres	
	Tatras Mtns	48.9	19.6	-13.2	223.8	18.2	5.0	121	-	-	251.0	299.0	Melaphyres	
		49.0	19.7	-16.2	249.6	11.4	6.0	300	-	-	251.0	299.0	Melaphyres	
Krucyk et al. (1989)														
Bulagria	Southern (mean)	-	-	64.0	343.0	5.2	167.3	6	-	-	145.5	199.6	-	
	Bliznak	42.2	27.5	22.0	351.0	9.0	46.3	7	-	-	150.8	161.2	-	
	Gradec	42.7	23.2	67.0	296.0	7.7	299.0	3	-	-	161.2	171.6	-	
	Zablano	42.5	23.0	50.0	13.0	5.5	119.1	7	-	-	171.6	167.6	-	
	Western Srednogorie	-	-	75.0	293.0	8.3	26.1	13	-	-	175.6	189.6	-	
	Stranja Mtns	-	-	-83.0	341.0	4.5	66.8	16	-	-	175.6	189.6	-	
	Kreiste	-	-	79.0	158.0	8.2	35.7	10	-	-	183.0	189.6	-	

**Table 2 continued**

Marschalko and Pagác (1980) <sup>3</sup>													
West Carpathians	(a)	-	-	40.0	263.0	9.0	-	8	-	110.0	70.6	89.3	
	(b)	-	-	53.0	308.0	7.0	-	20	-	66.0	70.6	89.3	
	(c)	-	-	53.0	260.0	3.0	-	28	-	114.0	70.6	89.3	
Márton (1984) <sup>2</sup>													
Pannonia	Moragy Area	-	-	57.0	94.0	9.3	28.0	45	-	-	99.6	145.5	Plutonics
	Moragy Area	-	-	18.0	189.0	11.4	36.0	50	-	-	318.1	359.2	Igneous
Márton (1987)													
Pannonia	East Mecsek	-	-	38.9	357.1	21.6	11.0	30	-	-	140.2	150.8	
	West Mecsek	-	-	-22.6	193.8	16.4	33.0	4	-	-	245.0	251.0	
West Carpathians (Inner)	Josavo-Perkupa	-	-	23.0	293.0	27.0	21.0	20	-	-	245.0	251.0	
Márton et al. (1988)													
Inner West Carpathians	Aggtelek Mountains 1	-	-	51.0	294	49.0	7.0	3	-	-			-
	Aggtelek Mountains 2	-	-	42.0	294	17.0	30.0	4	-	-			Early Triassic
	Aggtelek Mountains 3	-	-	46.0	259	20.0	12.0	6	-	-			Middle Triassic
	Rudabánya Mountatins	-	-	72.0	33	41.0	5.0	5	-	-			Late Triassic
Márton & Márton (1969) <sup>2</sup>													
Pannonia	E Mecsek	-	-	56.0	47.0	34.0	5.0	33	-	-	99.6	145.5	Plutonics
Márton & Márton (1969); Daglely & Ade-Hall, (1970) <sup>2</sup>													
Pannonia	Komlo	-	-	65.0	59.0	22.0	32.0	33	-	-	19.0	19.0	Plutonics
Márton & Márton (1978) <sup>2</sup>													
Pannonia	Villany Mtns	-	-	61.6	19.2	9.3	99.0	30	-	-	145.5	251.0	Sediments
Marton & Marton (1983) <sup>3</sup>	West Carpathians	-	-	55.0	318.0	7.0	-	34	-	55.0	70.6	89.3	-
Nozharov & Petkov (1976) <sup>2</sup>													
Balkans, Bulgaria	Vitosha	-	-	50.0	8.0	7.0	17.0	14	-	-	65.5	96.6	Plutonics
Nozharov & Veljovic (1974) <sup>2</sup>													
Eastern Serbia		43.0	22.3	67.0	6.0	5.3	13.0	27	-	-	83.5	93.5	Plutonics
Nozharov & Veljovic (1974); Nozharov et al. (1977) <sup>2</sup>													
Balkans, Bulgaria	Breznik	-	-	63.0	343.0	10.8	40.0	32	-	-	65.5	93.5	Plutonics
	Yambol,	-	-	57.0	354.0	17.0	13.0	69	-	-	65.5	93.5	Plutonics
Nozharov et al. (1977) <sup>2</sup>													
Balkans, Bulgaria	Plovdiv	-	-	66.0	29.0	22.0	33.0	24	-	-	23.0	33.9	Plutonics
	Bourgas	-	-	49.0	9.0	16.0	15.0	44	-	-	65.5	93.5	Plutonics
Nozharov et al. (1977); (1972) <sup>2</sup>													
Balkans, Bulgaria	Madjarova	-	-	48.0	2.0	29.0	19.0	23	-	-	23.0	33.9	Plutonics
Nozharov et al. (1977) <sup>3</sup>													
Balkans, Bulgaria	(a)	-	-	60.0	344.0	6.0	-	19	-	+30	70.6	89.3	-
	(b)	-	-	34.0	314.0	5.0	-	16	-	+51	70.6	89.3	-
Nozharov et al. (1980) <sup>2</sup>													
Balkans, Bulgaria	Tserovo, Bov.	43.0	23.4	39.4	26.1	2.6	23.0	129	-	-	199.6	251.0	-
	Smolianova	43.5	23.0	27.1	18.7	3.3	19.0	100	-	-	251.0	299.0	-
	Zwerino	43.3	23.6	1.2	228.2	3.0	33.0	71	-	-	288.0	320.0	-
Pătrașcu et al. (1990); (1992); (1993)													
Apuseni Mountains		-	-	-38.0	260.0	6.5	24.4	21	-	-			Upper Cretaceous
Southern Carpathians	Banat area	-	-	40.9	83.9	12.1	17.0	10	-	-			Upper Cretaceous
	Rusca/Hajeg	-	-	32.9	76.2	16.2	14.0	7	-	-			Upper Cretaceous
Stefanovic & Veljovic (1972) <sup>2</sup>													
Eastern Serbia	Bor	41.0	22.0	35.0	46.0	20.0	39.0	92	-	-	65.5	99.6	-

Data are listed by source, beginning with those within in which reference poles and vertical vertical rotations are constrained. Numbered localities (1-19) correspond to those plotted in Figure 6. Ages of magnetization (assumed to be primary) are taken as the central point between upper and lower rock age limits. Observed direction— inclination ( $I_o$ ) and declination ( $D_o$ ) of site mean paleomagnetic directions with 95% confidence circle radius ( $\alpha_{95}$ ), precision parameter ( $k$ ), and the number of sites used to calculate mean direction ( $n$ ). Inclination shallowing ( $\Delta I$ ) and vertical rotation ( $\Delta D$ ; positive indicates clockwise) are differences from expected directions calculated from a pole of reference. Latitude and longitude are degrees E and N, respectively.

<sup>1</sup>From the compilation of Dupont-Nivet (2005), <sup>2</sup>From the compilation of Márton et al. (1987), <sup>3</sup>from the compilation of Burtman (1986)