

PAS	PAZ	Composite depth (mcbf)	Age (ka BP)	Criteria for lower boundary	Main palynological characteristics (minimum – maximum in %)	Dominant vegetation type	MIS
IIIc	6	57.10 - 58.09	128.8 – 131.21	Occurrence <i>Pistacia</i>	AP: <i>Betula</i> (2-4%), dec. <i>Quercus</i> (1-13%), <i>Ephedra distachya</i> -type (0-3%), <i>Ulmus</i> (0-2%), <i>Juniperus</i> (0-1%), <i>Pinus</i> (0-1%), <i>Pistacia</i> cf. <i>atlantica</i> (0-1%) NAP: <i>Artemisia</i> (16-49%), Poaceae (7-25%), Chenopodiaceae (2-52%) GA: Low DC: Low CC: Moderate to high	Steppe taxa become less widespread, giving way to open grassland	5e
IV	1	58.09 - 63.25	131.21 - 139.87	Chenopodiaceae >40%	AP: Low AP (2-8%); increased frequencies of <i>Ephedra distachya</i> -type (1-5%); dec. <i>Quercus</i> , <i>Betula</i> , <i>Pinus</i> , and <i>Juniperus</i> are abundant at low level NAP: Chenopodiaceae (39-64%) show high values at the top, while <i>Artemisia</i> (8-29%) abundances decline; moderate Poaceae percentages GA: Low DC: Low CC: Low to moderate	Open desert steppe vegetation	6
	2	63.25 - 71.50	139.87 - 150.14	Chenopodiaceae <40%	AP: Low AP (1-7%); temperate trees are present at low level NAP: Expansion of <i>Artemisia</i> continues and peaks in the middle of the zone (54%); Chenopodiaceae percentages drop to 15-41%; moderate Poaceae values (11-34%) GA: Low with a single peak at 146.4 ka (c. 3,700 coenobia cm ⁻³) DC: Low CC: Low	Productive dwarf shrub steppe vegetation	
	3	71.50 - 77.72	150.14 - 162.49	Chenopodiaceae >40%; decrease <i>Quercus</i>	AP: Dec. <i>Quercus</i> , <i>Betula</i> , <i>Pinus</i> , and <i>Juniperus</i> are continuously present at low level (AP 2-8%); increase of <i>Ephedra distachya</i> -type (1-6%) NAP: Predominance of Chenopodiaceae (33-62%); <i>Artemisia</i> (6-38%) shows moderate values with increasing trend towards the top, Poaceae continuously present at ~13% GA: High to low at the end of the zone DC: Low to high CC: Low to moderate	Open desert steppe vegetation	
	4	77.72 - 83.84	162.49 - 173.38	Chenopodiaceae <40%; increase <i>Quercus</i>	AP: Low AP (1-14%); moderate dec. <i>Quercus</i> (0-3%); decrease of <i>Betula</i> (0-2%), while <i>Pinus</i> (0-5%) and <i>Juniperus</i> (0-1%) percentages increase towards at the top NAP: Predominance of <i>Artemisia</i> (10-46%) and Poaceae (8-54%); Chenopodiaceae abundances (5-40%) are reduced GA: Low to high DC: Low CC: Low with moderate peaks	Fluctuation between open desert-steppe and grassland scattered with temperate trees	
	5	83.84 - 93.51	173.38 - 185.74	Chenopodiaceae >40%	AP: AP (1-9%) decrease continuously throughout the zone; mainly by dec. <i>Quercus</i> (0-4%) NAP: Base marked by a pronounced expansion of Chenopodiaceae (33-64%); <i>Artemisia</i> continues from previous zone with max. 32%, while Poaceae decrease (3-18%) GA: Low DC: Low to high towards the top CC: Low	Change from grassland to desert steppe vegetation at the end of the zone	
	6	93.51 - 97.02	185.74 - 193.36	Decrease	AP: Reduction of AP; still abundant: dec. <i>Quercus</i> (1-31%), <i>Betula</i> (0-	Open grasslands with scattered	

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				<i>Quercus</i> ; increase Poaceae	2%), and <i>Ulmus</i> (<1%); moderate conifer trees with small oscillations; disappearance of <i>Pistacia</i> cf. <i>atlantica</i> NAP: Increase of Poaceae (21-45%); steppic herbs continue to be moderate GA: Low DC: Low CC: Low to moderate, peak at 189.4 ka	temperate trees	
Va	1	97.02 - 99.88	193.36 - 203.11	Increase AP; peak <i>Pistacia</i>	AP: High AP (24-44%), e.g., dec. <i>Quercus</i> (8-38%), increasing values of <i>Betula</i> (0-4%), <i>Pinus</i> (0-3%), and <i>Juniperus</i> (0-3%); peak of <i>Pistacia</i> cf. <i>atlantica</i> (c. 3%) at the beginning; high tree concentration (>3,000 grains cm ⁻³) NAP: Moderate percentages of steppic herbs (<i>Artemisia</i> 13-29% and Chenopodiaceae 11-33%) with significant peak of NAP (85%) near the base GA: Low DC: Low CC: Low to moderate with one single high peak at 201.3 ka (>5,000 particles cm ⁻³)	Expansion of oak steppe-forest along with Mediterranean taxa (<i>Pistacia</i>), short-term influence of steppe vegetation	7a
	2	99.88 - 101.30	203.11 - 207.56	AP <40%; decrease <i>Quercus</i>	AP: Reduced AP values (17-50%) mainly by dec. <i>Quercus</i> (10-30%) and <i>Pinus</i> (1-8%) but still above 15%; increase of <i>Ephedra distachya</i> -type (1-3%) and <i>Betula</i> (0-2%) NAP: Expansion of Chenopodiaceae (15-47%), peak of <i>Artemisia</i> (9-32%) at the beginning; moderate Poaceae (5-19%) GA: Low DC: Low to high CC: Low to moderate	More open (steppe) landscape with still patchy pioneer & temperate tree	7b
	3	101.30 - 104.19	207.56 - 216.28	Chenopodiaceae <40%; increase <i>Quercus</i>	AP: Predominance of dec. <i>Quercus</i> (2-56%) with significant peak at 102.8 mcbf (212.6 ka) followed by a decreasing trend; high values of <i>Pinus</i> (0-19%); <i>Betula</i> (0-4%) and <i>Juniperus</i> (0-2%) are abundant; <i>Pistacia</i> cf. <i>atlantica</i> and <i>Ulmus</i> pollen occur sporadically; high AP concentration (>3,000 grains cm ⁻³) NAP: Peak of <i>Artemisia</i> (6-38%), Poaceae (5-21%), and Tubuliflorae (2-13%) at the beginning; very low Chenopodiaceae values (4-48%) GA: Low DC: No occurrence CC: High	Expansion of oak-pine steppe-forest	7c
Vb		104.19 - 109.05	216.28 - 227.42	Chenopodiaceae >40%	AP: Very low AP percentages (1-12%) and concentration (<2,000 grains cm ⁻³); decrease of dec. <i>Quercus</i> (0-9%), <i>Pinus</i> (0-3%), and <i>Juniperus</i> (<1%) NAP: Predominance of Chenopodiaceae (37-76%); Poaceae (4-15%), and <i>Artemisia</i> (6-26%) are abundant GA: Low DC: Low CC: Low with moderate values at the end	Extensive desert steppe vegetation	7d
Vc	1	109.05 - 109.94	227.42 - 230.71	Disappearance	AP: Decrease in AP (14-19%), mainly dec. <i>Quercus</i> (2-5%), <i>Pinus</i> (2-	Increasing influence of steppe	7e

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				<i>Pistacia</i> ; decrease AP, increase Chenopodiaceae	10%); <i>Pistacia</i> cf. <i>atlantica</i> disappears NAP: Strong increase in Chenopodiaceae (23-32%), reduced <i>Artemisia</i> (19-27 %) and Poaceae (18-26%) GA: Low DC: Low CC: Low	taxa, expansion of open vegetation	
	2	109.94 - 111.73	230.71 - 236.95	Decrease <i>Quercus</i> and <i>Pistacia</i> ; increase <i>Pinus</i>	AP: Percentages of dec. <i>Quercus</i> (6-21%), <i>Betula</i> (0-1% and <i>Pistacia</i> cf. <i>atlantica</i> decline while those of <i>Pinus</i> (4-26%) and <i>Juniperus</i> (2-5%) rise NAP: Increased steppic taxa, e.g., <i>Artemisia</i> (5-26%) and Poaceae (21-36%); still low Chenopodiaceae (3-13%) GA: High DC: Low CC: Low with one peak at the end	All temperate tree taxa declined gradually, while <i>Pinus</i> and grassland expanded (Pinus-dominated steppe-forest)	
	3	111.73 - 112.64	236.95 - 240.31	<i>Quercus</i> >10%; Chenopodiaceae <40%	AP: Peak values for <i>Betula</i> (4-8%) and <i>Pistacia</i> cf. <i>atlantica</i> (1-2%), expansion of dec. <i>Quercus</i> (10-40%); <i>Pinus</i> (0-3%), <i>Juniperus</i> (0-1%), and <i>Ulmus</i> are abundant; highest AP concentration (c. 5,300-15,300 grains cm ⁻³) NAP: Retreat in steppe percentages mainly <i>Artemisia</i> (13-37%) Chenopodiaceae (3-6%); moderate Poaceae values (12-20%) GA: Low DC: No occurrence CC: Moderate to high	Expansion of oak steppe-forest along with Mediterranean sclerophylls (<i>Pistacia</i>)	
	4	112.64 - 113.70	240.31 - 242.48	Occurrence <i>Pistacia</i>	AP: Increase in temperate AP, e.g., dec. <i>Quercus</i> (1-10%) and <i>Betula</i> (1-5%); occurrence of <i>Pistacia</i> cf. <i>atlantica</i> (~1%), <i>Juniperus</i> (~1%), and <i>Ulmus</i> (sporadic) NAP: Herbaceous taxa continue, mainly Poaceae (7-20%) and <i>Artemisia</i> (37-56%); Chenopodiaceae decrease (6-59%) GA: Low DC: No occurrence CC: Moderate to high	Steppe taxa become less widespread, giving way to open grassland	
VI		113.70 - 117.19	242.48 - 250.16	Not defined	AP: Very low abundances of AP (<i>Betula</i> 0-1% and dec. <i>Quercus</i> 0-1%), very low tree concentration (c. 570-1320 grains cm ⁻³) NAP: Predominance of steppe taxa, mainly Chenopodiaceae (52-66%) and <i>Artemisia</i> (18-33%) GA: Low DC: Low CC: Moderate	Extensive open desert-steppe vegetation	8