WITHIN-PLATE VOLCANISM IN UPPER TRIASSIC TO LOWER JURASSIC PUCARÁ GROUP CARBONATES (CENTRAL PERU)

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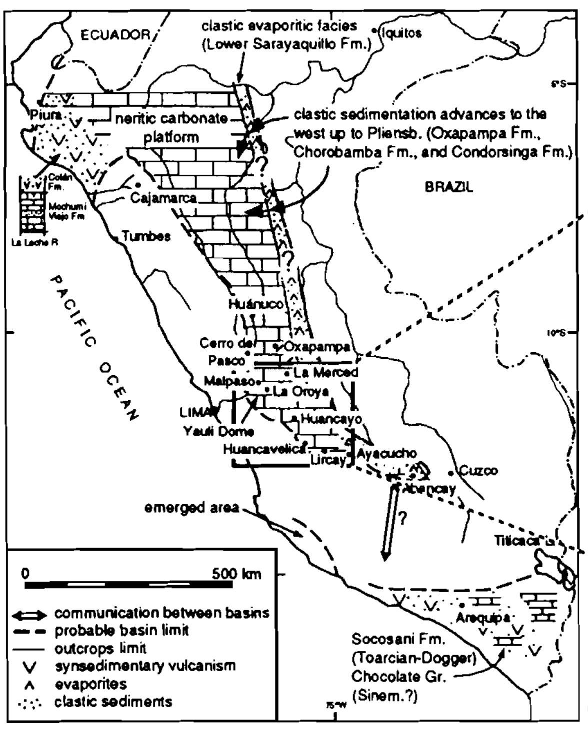
INTRODUCTION

The Pucará Group platform carbonates (Upper Triassic - Lower Jurassic) were laid down in northern and central Peru in a NNW-SSE elongated basin (Fig. 1). They represent the first sediments of the Andean cycle, the beginning of which is marked by a Norian transgression (Mégard, 1978). The sedimentary evolution of the Pucará Group can be explained in terms of a large transgressive/regressive second order sequence which consists of predominantly shallow water carbonates including a maximum flooding period represented by ammonite-bearing bituminous calcareous shales.

Detailed investigations in the southern part of the basin show that the Pucará Group thickens progressively from west to east in the form of a half-graben (Fig. 2). This can be explained by asymmetrical subsidence during sedimentation such being assisted by contemporaneous faulting along the eastern margin of the basin (permitting rapid subsidence) and a stable hinge zone to the west. Synsedimentary tectonics at the eastern edge led to the formation of discrete structural blocks with extreme variations in thickness and facies. It has been suggested that, during burial diagenesis, these faults served as channelways for the basinal brines responsible for MVT-mineralization (Fontboté et al., 1995, Spangenberg, 1995, and Moritz et al., 1996).



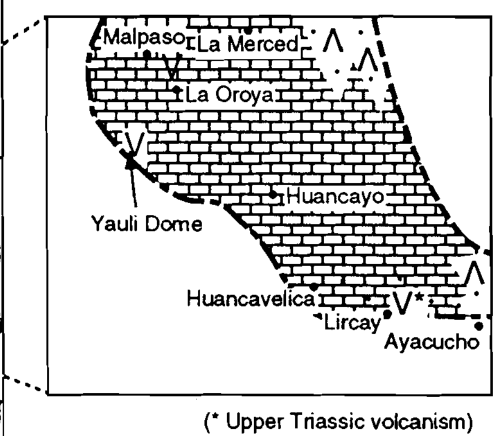


Fig. 1. Paleogeographic scheme for the Liassic. Modified from Audebaud et al. (1973), Mégard (1978), Fontboté (1990), and Rosas (1994).

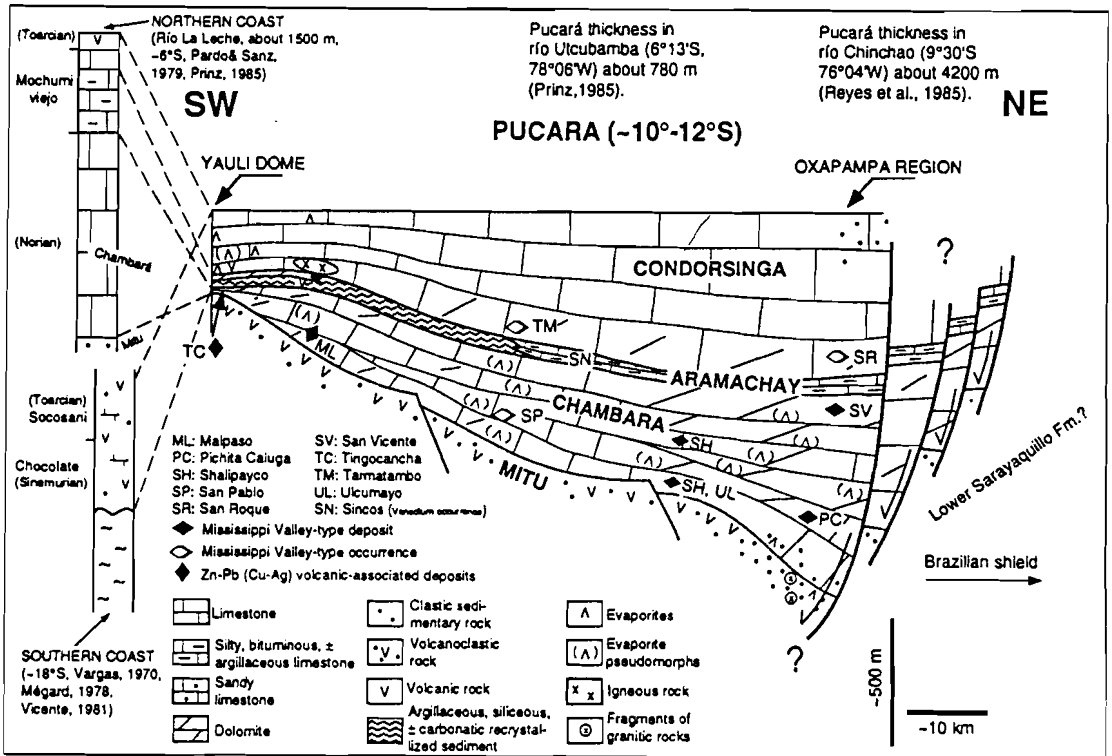


Fig. 2. Schematic section of the Pucará Group and its western equivalents. The location of some MVT and volcanic-associated deposits is shown (from Rosas & Fontboté, 1995)

Table 1. XRF-analyses of magmatic rocks intercalated in the Pucará Group.

Unit	Montero volcanic rocks in Condorsinga Fm. (Liassic)					Tuffs in Aramachay Fm. (Liassic)			Volcanic rocks in Chambará Fm. (Triassic)		
Section	Yauli Dome					Yauli D.	Malpaso		Lircay		
Sample	PB-51	PB-53	PB-54	PB-55	PB-56	PB-22	PA-103	PA-107	HU-17	HU-21	HU-23
height (m)	127.7	126.0	129.5	135.0	149.5	33.3	350.2	366.0	(2 analyses)		
%											
SiO_2	53.55	53.71	51.55	53.47	41.78	56.93	72.28	72.02	46.36	44.25	47.01
TiO_2	2.23	1.76	2.26	2.30	2.16	0.89	0.51	0.26	2.64	1.71	2.19
Al_2O_3	13.94	10.60	13.81	14.10	13.71	22.11	14.25	10.82	14.76	15.32	15.16
Fe_2O_3	11.78	8.37	15.54	11.68	10.36	1.04	0.83	0.41	10.88	9.43	10.21
MnO	0.14	0.06	0.18	0.18	0.16	0.01	bdl	bdl	0.21	0.46	0.15
MgO	4.12	0.14	3.55	4.10	2.04	0.77	0.88	0.58	6.43	5.27	6.62
CaO	6.54	10.26	5.35	6.33	11.37	5.44	2.13	6.20	7.90	7.86	9.30
Na_2O	3.00	5.02	4.04	3.76	4.41	0.06	bdl	0.39	4.05	4.66	3.02
K_2O	2.21	1.63	2.53	1.78	1.79	1.53	1.99	1.99	2.06	1.82	1.73
P_2O_5	0.57	0.40	0.51	0.37	0.31	0.18	0.12	0.16	no data	0.29	0.93
LOI	2.42	8.11	1.20	1.50	10.64	10.96	6.87	7.03	4.50	8.64	2.73
ppm											
Ba	427	194	427	381	302	151	38	84	384	399	732
La	20	13	15	10	30	34	18	17	no data	31	32
Ce	56	44	39	41	51	75	55	60	no data	37	91
Cr	20	13	19	19	24	<5	6	<5	no data	322	294
Ni	11	<5	12	17	<2	7	<5	<5	no data	250	419
Rb	67	29	54	46	30	51	53	55	22	40	34
Sr	200	96	352	333	114	467	224	250	157	284	963
Y	59	47	47	54	36	31	57	26	no data	21	27
Zr	301	244	193	212	198	447	323	152	186	124	217
Nb	14	13	8	9	<5	19	14	6	no data	23	50
V	376	312	420	435	422	67	15	10	no data	215	188
Co	56	24	65	59	31	bdl	bdl	bdl	no data	50	40.00
Cu	49	70	12	17	<4	18	20	16	no data	13	49
Pb	7	22	6	4	<2	18	2	33	no data	41	118
Zn	95	105	70	78	64	no data	bdl	bdl	no data	198	113.00
TOTAL (%)	100.68	100.18	100.69	99.74	100.51	100.06	99.94	99.93	99.83	99.91	99.39

bdl= below detection limit, LOI=lost on ignition

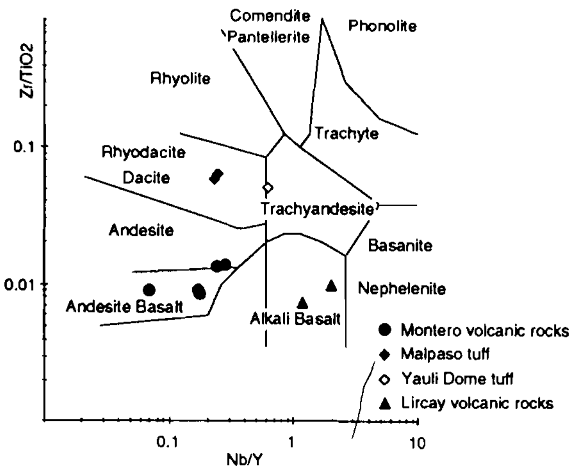


Fig. 3. Nb/Y vs Zr/TiO diagram (after WINCHESTER & FLOYD, 1977) for classification of magmatic rocks.

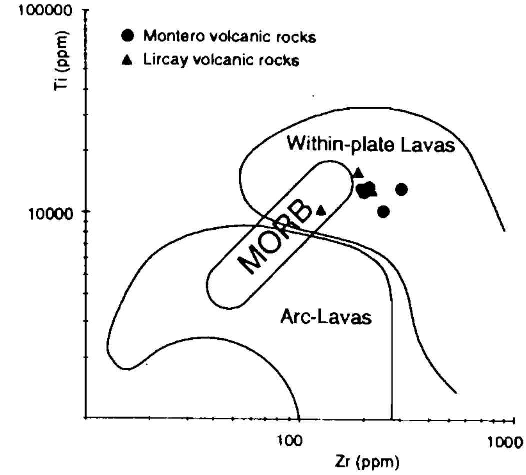


Fig. 4. Ti vs Zr diagram (after PEARCE, 1982) for interpretation of the origin of magmatic rocks.

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