

Mineralogical and Sedimentological Characterization of the Clay-Rich Sediments from Ases Cave (Cova Dets Ases, Mallorca, Spain): Origin and Classification

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Supplementary Materials:

Table S1. Relative proportions of the mineral phases detected in the whole rock and <2 µm fractions XRD patterns of the sediment samples in Dets Ases Cave.

		Mineral (%)										
		Qz	Cal	Dol	Pl	K Fsp	Hem	Gth	Kln	Chl	Ill	Sme
Sample label												
AREA A	1AT	<5	-	-	<5	<5	<5	7	32	-	50	-
	2AT	13	-	-	<5	<5	<5	-	28	18	33	-
	3AT	21	-	-	<5	<5	<5	15	14	10	33	-
	4AT	<5	49	<5	<5	-	<5	-	8	8	24	-
	5AT	15	-	-	-	-	<5	-	16	14	51	-
	6AS	9	-	-	<5	<5	<5	7	29	-	47	-
AREA B	1BT	<5	79	-	-	-	<5	-	9	-	11	-
	2BS	9	80	-	-	-	-	-	<5	<5	7	<5
	3BS	47	11	<5	<5	-	<5	-	<5	<5	26	<5
	4BS	60	19	-	-	-	<5	-	<5	<5	14	<5
	5BS	<5	95	-	-	-	-	-	<5	<5	<5	-
	6BS	15	-	-	-	-	<5	-	15	13	46	8
AREA C	1CS	6	86	<5	-	-	-	-	<5	<5	<5	-
	2CS	-	100	-	-	-	-	-	-	-	-	-
	3CS	<5	96	-	-	-	-	-	-	-	<5	-
	4CS	15	15	<5	-	-	-	5	13	10	35	5
AREA D	1DT	5	-	-	-	-	<5	-	16	13	64	-
	2DT	41	24	11	-	-	-	-	<5	<5	19	-
	3DT	-	97	<5	-	-	-	-	<5	-	<5	-
	4DT	46	31	8	<5	-	-	-	<5	<5	10	-
	5DT	6	-	-	-	-	<5	-	19	17	55	-
	6DT	8	<5	-	-	-	<5	-	15	13	60	-
	7DT	5	-	-	-	-	<5	-	14	14	65	-
	8DT	8	5	-	-	-	<5	-	15	15	55	-
AREA E	1ES	16	7	-	-	-	<5	<5	19	10	42	-
	2ES	77	<5	-	-	<5	-	<5	<5	<5	14	-
	3ES	42	30	-	-	<5	-	<5	<5	<5	18	-
	4ES	32	46	<5	-	<5	-	<5	<5	<5	12	<5

5ES	46	-	-	-	<5	-	<5	6	6	37	-
6ES	65	21	-	<5	<5	-	-	<5	<5	9	<5
SOIL	45	20	-	-	<5	-	<5	8	-	23	-
BEDROCK	<5	97	-	-	-	-	-	<5	-	<5	-

Table S2. Kaolinite crystallinity in the sediments from Dets Ases Cave measured in air-dried oriented aggregates.

AREA	Sample label	KC AD (001)	Average
A	1AT	0.26	0.27
	2AT	0.21	
	3AT	0.28	
	4AT	-	
	5AT	0.332	
	6AS	0.33	
B	1BT	0.38	0.33
	2BS	0.25	
	3BS	0.31	
	4BS	0.26	
	5BS	0.36	
	6BS	0.35	
C	1CS	0.3	0.29
	2CS	0.26	
	3CS	0.33	
	4CS	0.25	
D	1DT	0.43	0.35
	2DT	0.32	
	3DT	0.28	
	4DT	0.25	
	5DT	0.44	
	6DT	0.53	
	7DT	0.34	
	8DT	0.21	
E	1ES	0.34	0.32
	2ES	0.29	
	3ES	0.29	
	4ES	0.37	
	5ES	0.29	
	6ES	0.33	
SOIL		0.37	
BEDROCK		0.12	

Table S3. Grain size analysis of Des Ases cave; statistical results, classification and general composition.

AREA A						
	1AT	2AT	3AT	4AT	5AT	6AT
SAMPLE TYPE:	Bi	Bi	Uni	Bi	Uni	Uni
MEAN	6.75	4.09	3.63	0.13	4.17	3.40
SORTING	2.66	2.89	2.20	0.82	2.45	2.25
SKEWNESS	-0.31	0.54	0.31	0.04	0.38	0.43
KURTOSIS	0.68	0.71	1.13	0.88	0.92	1.15
D₅₀ (φ):	7.45	2.92	3.26	0.12	3.57	2.85
% GRAVEL:	0	0	0.1	6.2	0	0
% SAND:	23	60.4	63.8	93.8	56.5	69.7
% MUD:	77	39.6	36.2	0	43.5	30.3

AREA B						
	1BT	2BS	3BS	4BS	5BS	6BS
SAMPLE TYPE:	Bi	Poly	Uni	Uni	Uni	Bi
MEAN	4.18	3.99	6.58	4.68	1.72	4.46
SORTING	3.36	2.95	2.21	1.82	2.00	2.62
SKEWNESS	0.23	0.44	-0.16	0.22	0.49	0.37
KURTOSIS	0.74	0.83	1.04	1.19	1.21	0.91
D₅₀ (φ):	3.60	3.01	6.78	4.48	1.15	3.76
% GRAVEL:	0.3	0.1	0	0	0.2	0
% SAND:	53.7	69.9	13.9	37.4	84.1	53.7
% MUD:	46	30.0	86.1	62.6	15.7	46.3

AREA C				
	1CS	2CS	3CS	4CS
SAMPLE TYPE:	Bi	Bi	Bi	Uni
MEAN	2.78	2.88	2.97	2.11
SORTING	1.92	2.17	2.25	2.26
SKEWNESS	0.43	0.40	0.48	0.42
KURTOSIS	1.19	0.93	0.82	1.19
D₅₀ (φ):	2.28	2.29	2.20	1.56
% GRAVEL:	0	0.1	0	0.5
% SAND:	77	70.8	68.4	79.7
% MUD:	23	29.1	31.6	19.7

AREA D								
	1DT	2DT	3DT	4DT	5DT	6DT	7DT	8DT
SAMPLE TYPE:	Bi	Uni	Uni	Bi	Poly	Bi	Bi	Bi
MEAN	4.07	3.89	2.53	2.97	4.31	6.14	3.80	4.19
SORTING	2.90	2.26	2.16	2.36	3.06	3.13	2.91	3.19
SKEWNESS	0.50	0.17	0.33	0.43	0.53	-0.36	0.57	0.41
KURTOSIS	0.70	0.97	0.87	0.97	0.65	0.64	0.88	0.72
D₅₀ (φ):	2.98	3.71	2.07	2.34	3.04	7.06	2.56	3.11
% GRAVEL:	0	0	0	0	0	0	0	0
% SAND:	0.6	0.6	0.7	0.6	0.6	0.3	0.7	0.6

% MUD:	0.4	0.5	0.3	0.4	0.4	0.7	0.3	0.4
SAMPLE TYPE:	AREA E							
	1ES	2ES	3ES	4ES	5ES	6ES		
	Poly	Uni	Bi	Bi	Poly	Poly		
	MEAN	5.04	6.00	5.86	4.58	4.74	5.40	
	SORTING	3.40	1.72	3.24	3.47	3.45	2.71	
	SKEWNESS	-0.07	0.27	-0.35	-0.19	-0.10	0.05	
	KURTOSIS	0.73	1.08	1.06	0.90	0.72	1.25	
	D₅₀ (φ):	26.86	19.13	9.620	26.98	29.46	28.59	
% GRAVEL:	0.2	0	0.2	0.7	0.3	0.2		
% SAND:	39.1	8.4	21.8	35.6	40.5	26.2		
% MUD:	60.7	91.6	78.0	63.7	59.2	73.6		