GSA Data Repository Item 2019349

Pizzati, M., Balsamo, F., Storti, F., and Iacumin, P., 2019, Physical and chemical strain-hardening during faulting in poorly lithified sandstone: The role of kinematic stress field and selective cementation: GSA Bulletin, https://doi.org/10.1130/B35296.1.

Data Repository

Table DR1. Concretion sample name, morphology and type, maximum measured thickness, structural domain and geographical coordinates.

Table DR2. Complete isotopic data plotted in Fig. 10 subdivided between the concretions sampled through the Rocca di Neto fault zone.

Table DR3. Statistical tests to evaluate differences and similarities between isotopic data sets ($\delta^{13}C$ and $\delta^{18}O$) from the structural domains composing the fault zone. Prior to the tests, the probability to have normal Gaussian data distribution was checked (Shapiro-Wilk test). The probability to gain the same variance from the data sets was tested via F test. Eventually, t-Student test (with different variance) was adopted to check the probability to obtain the same mean from two different data sets. Isotopic data sets were cross-checked in pairs to evaluate the similarities between every possible combination.

Table DR4. Results of the back-calculation of the $\delta^{18}O$ composition of the cementing fluids according to the fractionation formula of Friedman and O'Neil (1977) for water-calcite system. Data are reported also in the main text and compared with the expected isotopic composition of meteoric and marine water for the Crotone Basin area (Balsamo et al., 2012; Giustini et al., 2016).

TABLE 1. CONCRETION SAMPLES AND POSITION ALONG THE ROCCA DI NETO FAULT ZONE

n°	Sample name	Type and geometry	Thickness (cm)	Structural domain	Latitude	Longitude
1	RN1.C1	Tabular fault-parallel	4	Low-deformation Zone	39° 10' 55.13'' N	16° 59' 20.17'' E
2	RN1.C1A	Tabular fault-parallel	5	Low-deformation Zone	39° 10' 55.13'' N	16° 59' 20.17'' E
3	RN1.C1B	Tabular fault-parallel	9	Low-deformation Zone	39° 10' 54.65'' N	16° 59' 21.28'' E
4	RN1.C2A	Tabular fault-parallel	3	Low-deformation Zone	39° 10' 54.75'' N	16° 59' 20.63'' E
5	RN1.C2B	Deformed fault-parallel	3	Footwall Mixed Zone	39° 10' 54.07'' N	16° 59' 21.51'' E
6	RN1.C3	Tabular fault-parallel	4	Low-deformation Zone	39° 10' 54.43'' N	16° 59' 20.89'' E
7	RN1.C4	Tabular erosive surface	6	Low-deformation Zone	39° 10' 54.41'' N	16° 59' 20.89'' E
8	RN1.C5	Tabular fault-parallel	7	Footwall Damage Zone	39° 10' 53.83'' N	16° 59' 21.25'' E
9	RN1.C6	Tabular fault-parallel	3.5	Footwall Mixed Zone	39° 10' 53.66'' N	16° 59' 21.21'' E
10	RN1.C7	Deformed fault-parallel	8	Footwall Mixed Zone	39° 10' 53.63'' N	16° 59' 21.19'' E
11	RN1.C8	Deformed fault-parallel	4	Fault Core	39° 10' 53.50'' N	16° 59' 21.20'' E
12	RN1.C8B	Deformed fault-parallel	6.5	Fault Core	39° 10' 53.50'' N	16° 59' 21.20'' E
13	RN1.C9	Deformed fault-parallel	6	Fault Core	39° 10' 54.06'' N	16° 59' 21.57'' E
14	RN1.C10	Tabular fault-parallel	4	Footwall Damage Zone	39° 10' 54.25'' N	16° 59' 21.45'' E
15	RN1.C11	Dissected-displaced	5	Footwall Mixed Zone	39° 10' 53.62'' N	16° 59' 21.12'' E
16	RN1.C12	Tabular fault-parallel	9	Footwall Damage Zone	39° 10' 54.91'' N	16° 59' 22.31'' E
17	RN1.C13	Dissected-displaced	7	Footwall Mixed Zone	39° 10' 54.19'' N	16° 59' 21.81'' E
18	RN1.C14	Dissected-displaced	3	Fault Core	39° 10' 54.02'' N	16° 59' 21.85'' E
19	RN1.C15	Deformed fault-parallel	4	Fault Core	39° 10' 54.06'' N	16° 59' 21.90'' E
20	RN2.C1	Tabular fault-parallel	7	Footwall Damage Zone	39° 10' 54.84'' N	16° 59' 21.56'' E
21	RN2.C2	Dissected-displaced	11	Footwall Mixed Zone	39° 10' 54.39'' N	16° 59' 22.28'' E
22	RN3.C1	Tabular fault-parallel	5	Footwall Damage Zone	39° 10' 54.99'' N	16° 59' 21.63'' E
23	RN3.C2	Deformed fault-parallel	8	Footwall Mixed Zone	39° 10' 54.75'' N	16° 59' 22.76'' E

Table 1: concretion sample name, morphology and type, maximum measured thickness, structural domain and geographical coordinates.

TABLE 2. COMPLETE ISOTOPIC DATA SET

n°	Sample name	Type and geometry	Structural domain	$\delta^{18}O$ (‰ V-PDB)	$\delta^{13}C$ (‰ V-PDB)
1	RN1.C1 R1	Tabular fault-parallel	Low-deformation Zone	-5,63	-13,18
2	RN1.C1 R2	Tabular fault-parallel	Low-deformation Zone	-5,57	-12,78
3	RN1.C1 R3	Tabular fault-parallel	Low-deformation Zone	-5,96	-13,76
4	RN1.C1 R4	Tabular fault-parallel	Low-deformation Zone	-5,77	-12,89
5	RN1.C1 R5	Tabular fault-parallel	Low-deformation Zone	-5,43	-13,49
6	RN1.C1 R6	Tabular fault-parallel	Low-deformation Zone	-5,63	-12,68
7	RN1.C1 R7	Tabular fault-parallel	Low-deformation Zone	-5,30	-11,73
8	RN1.C1 R8	Tabular fault-parallel	Low-deformation Zone	-6,17	-13,83
9	RN1.C1 R9	Tabular fault-parallel	Low-deformation Zone	-5,91	-15,68
10	RN1.C1 C1	Tabular fault-parallel	Low-deformation Zone	-5,94	-12,40
11	RN1.C1 C2	Tabular fault-parallel	Low-deformation Zone	-6,09	-13,31
12	RN1.C1 C3	Tabular fault-parallel	Low-deformation Zone	-5,70	-14,31
13	RN1.C1 C4	Tabular fault-parallel	Low-deformation Zone	-5,15	-9,20
14	RN1.C1A R1	Tabular fault-parallel	Low-deformation Zone	-5,39	-12,67
15	RN1.C1A R2	Tabular fault-parallel	Low-deformation Zone	-5,47	-13,92
16	RN1.C1A R3	Tabular fault-parallel	Low-deformation Zone	-5,48	-13,39
17	RN1.C1A R4	Tabular fault-parallel	Low-deformation Zone	-6,14	-15,43
18	RN1.C1A R5	Tabular fault-parallel	Low-deformation Zone	-5,44	-13,41
19	RN1.C1A R6	Tabular fault-parallel	Low-deformation Zone	-5,71	-13,70
20	RN1.C1A R7	Tabular fault-parallel	Low-deformation Zone	-5,81	-14,37
21	RN1.C1A R8	Tabular fault-parallel	Low-deformation Zone	-5,44	-14,32
22	RN1.C1A R9	Tabular fault-parallel	Low-deformation Zone	-5,57	-13,09
23	RN1.C1A R10	Tabular fault-parallel	Low-deformation Zone	-5,78	-12,57
24	RN1.C1A R11	Tabular fault-parallel	Low-deformation Zone	-5,95	-14,76
25	RN1.C1A C1	Tabular fault-parallel	Low-deformation Zone	-6,16	-14,21
26	RN1.C1A C2	Tabular fault-parallel	Low-deformation Zone	-5,88	-14,64
27	RN1.C1A C3	Tabular fault-parallel	Low-deformation Zone	-6,30	-15,96
28	RN1.C1A C4	Tabular fault-parallel	Low-deformation Zone	-5,22	-13,48
29	RN1.C1A C5	Tabular fault-parallel	Low-deformation Zone	-6,41	-15,72
30	RN1.C2 R1	Tabular fault-parallel	Low-deformation Zone	-5,51	-19,29
31	RN1.C2 R2	Tabular fault-parallel	Low-deformation Zone	-4,12	-12,43
32	RN1.C2 R3	Tabular fault-parallel	Low-deformation Zone	-5,32	-16,57
33	RN1.C2 R4	Tabular fault-parallel	Low-deformation Zone	-4,75	-15,64
34	RN1.C2 R5	Tabular fault-parallel	Low-deformation Zone	-4,31	-14,23
35	RN1.C2 R6	Tabular fault-parallel	Low-deformation Zone	-5,24	-16,73
36	RN1.C2 C1	Tabular fault-parallel	Low-deformation Zone	-5,38	-18,61
37	RN1.C2 C2	Tabular fault-parallel	Low-deformation Zone	-4,84	-15,18
38	RN1.C2 C3	Tabular fault-parallel	Low-deformation Zone	-6,05	-17,98
39	RN1.C2 C4	Tabular fault-parallel	Low-deformation Zone	-5,28	-17,81
40	RN1.C2 C5	Tabular fault-parallel	Low-deformation Zone	-6,30	-20,56
41	RN1.C3 R1	Tabular fault-parallel	Low-deformation Zone	-5,50	-17,40
42	RN1.C3 R2	Tabular fault-parallel	Low-deformation Zone	-5,35	-19,49
43	RN1.C3 R3	Tabular fault-parallel	Low-deformation Zone	-5,72	-20,18
44	RN1.C3 R4	Tabular fault-parallel	Low-deformation Zone	-5,59	-19,13

45	RN1.C3 R5	Tabular fault-parallel	Low-deformation Zone	-6,29	-19,49
46	RN1.C3 R6	Tabular fault-parallel	Low-deformation Zone	-6,17	-18,89
47	RN1.C3 C1	Tabular fault-parallel	Low-deformation Zone	-6,71	-15,87
48	RN1.C3 C2	Tabular fault-parallel	Low-deformation Zone	-5,78	-16,30
49	RN1.C3 C3	Tabular fault-parallel	Low-deformation Zone	-5,51	-18,81
50	RN1.C3 C4	Tabular fault-parallel	Low-deformation Zone	-5,89	-20,10
51	RN1.C3 C5	Tabular fault-parallel	Low-deformation Zone	-4,56	-13,31
52	RN1.C4 R1	Tabular erosive surface	Low-deformation Zone	-6,66	-9,30
53	RN1.C4 R2	Tabular erosive surface	Low-deformation Zone	-3,10	-4,03
54	RN1.C4 R3	Tabular erosive surface	Low-deformation Zone	-2,31	-2,58
55	RN1.C4 R4	Tabular erosive surface	Low-deformation Zone	-1,55	-0,08
56	RN1.C4 R5	Tabular erosive surface	Low-deformation Zone	-2,77	-3,57
57	RN1.C4 R6	Tabular erosive surface	Low-deformation Zone	-2,97	-3,61
58	RN1.C4 R7	Tabular erosive surface	Low-deformation Zone	-4,18	-5,86
59	RN1.C4 R8	Tabular erosive surface	Low-deformation Zone	-2,30	-2,28
60	RN1.C4 R9	Tabular erosive surface	Low-deformation Zone	-4,52	-5,86
61	RN1.C4 R10	Tabular erosive surface	Low-deformation Zone	-5,67	-8,98
62	RN1.C4 C1	Tabular erosive surface	Low-deformation Zone	-6,11	-9,39
63	RN1.C4 C2	Tabular erosive surface	Low-deformation Zone	-6,07	-9,24
64	RN1.C4 C3	Tabular erosive surface	Low-deformation Zone	-5,64	-9,31
65	RN1.C4 C4	Tabular erosive surface	Low-deformation Zone	-5,40	-9,08
66	RN1.C4 C5	Tabular erosive surface	Low-deformation Zone	-5,69	-9,28
67	RN1.C4 C6	Tabular erosive surface	Low-deformation Zone	-5,49	-9,19
68	RN1.C4 C7	Tabular erosive surface	Low-deformation Zone	-5,55	-9,23
69	RN1.C5 R1	Tabular fault-parallel	Footwall Damage Zone	-3,34	-4,03
70	RN1.C5 R2	Tabular fault-parallel	Footwall Damage Zone	-1,35	-0,03
71	RN1.C5 R3	Tabular fault-parallel	Footwall Damage Zone	-1,32	-0,66
72	RN1.C5 R4	Tabular fault-parallel	Footwall Damage Zone	-3,20	-2,40
73	RN1.C5 R5	Tabular fault-parallel	Footwall Damage Zone	-2,87	-1,79
74	RN1.C5 R6	Tabular fault-parallel	Footwall Damage Zone	-2,54	-1,39
75	RN1.C5 C1	Tabular fault-parallel	Footwall Damage Zone	-1,25	-0,02
76	RN1.C5 C2	Tabular fault-parallel	Footwall Damage Zone	-2,39	-1,09
77	RN1.C5 C3	Tabular fault-parallel	Footwall Damage Zone	-1,80	-0,59
78	RN1.C5 C4	Tabular fault-parallel	Footwall Damage Zone	-2,74	-1,82
79	RN1.C5 C5	Tabular fault-parallel	Footwall Damage Zone	-1,94	-1,19
80	RN1.C5 C6	Tabular fault-parallel	Footwall Damage Zone	-1,84	-1,30
81	RN1.C5 C7	Tabular fault-parallel	Footwall Damage Zone	-2,08	-1,21
82	RN1.C5 C8	Tabular fault-parallel	Footwall Damage Zone	-1,98	-1,52
83	RN1.C5 C9	Tabular fault-parallel	Footwall Damage Zone	-1,96	-1,35
84	RN1.C5 C10	Tabular fault-parallel	Footwall Damage Zone	-1,86	-1,27
85	RN1.C6 R1	Tabular fault-parallel	Footwall Mixed Zone	-2,25	-1,27
86	RN1.C6 R2	Tabular fault-parallel	Footwall Mixed Zone	-2,30	-1,44
87	RN1.C6 R3	Tabular fault-parallel	Footwall Mixed Zone	-2,17	-1,02
88	RN1.C6 R4	Tabular fault-parallel	Footwall Mixed Zone	-2,44	-1,18
89	RN1.C6 R5	Tabular fault-parallel	Footwall Mixed Zone	-2,56	-0,91
90	RN1.C6 R6	Tabular fault-parallel	Footwall Mixed Zone	-2,04	-1,33
91	RN1.C6 R7	Tabular fault-parallel	Footwall Mixed Zone	-2,86	-1,24

92	RN1.C6 C1	Tabular fault-parallel	Footwall Mixed Zone	-1,89	-1,32
93	RN1.C6 C2	Tabular fault-parallel	Footwall Mixed Zone	-2,69	-1,49
94	RN1.C6 C3	Tabular fault-parallel	Footwall Mixed Zone	-2,59	-1,26
95	RN1.C6 C4	Tabular fault-parallel	Footwall Mixed Zone	-2,89	-0,92
96	RN1.C6 C5	Tabular fault-parallel	Footwall Mixed Zone	-2,86	-1,30
97	RN1.C6 C6	Tabular fault-parallel	Footwall Mixed Zone	-2,61	-1,20
98	RN1.C6 C7	Tabular fault-parallel	Footwall Mixed Zone	-2,89	-0,77
99	RN1.C6 C8	Tabular fault-parallel	Footwall Mixed Zone	-3,98	-0,71
100	RN1.C7 R1	Deformed fault-parallel	Footwall Mixed Zone	-1,83	-1,62
101	RN1.C7 R2	Deformed fault-parallel	Footwall Mixed Zone	-2,47	-0,95
102	RN1.C7 R3	Deformed fault-parallel	Footwall Mixed Zone	-2,12	-0,82
103	RN1.C7 R4	Deformed fault-parallel	Footwall Mixed Zone	-2,44	-1,21
104	RN1.C7 R5	Deformed fault-parallel	Footwall Mixed Zone	-2,34	-1,45
105	RN1.C7 R6	Deformed fault-parallel	Footwall Mixed Zone	-1,78	-0,89
106	RN1.C7 R7	Deformed fault-parallel	Footwall Mixed Zone	-2,03	-1,01
107	RN1.C7 R8	Deformed fault-parallel	Footwall Mixed Zone	-2,12	-0,92
108	RN1.C7 R9	Deformed fault-parallel	Footwall Mixed Zone	-2,14	-0,92
109	RN1.C7 R10	Deformed fault-parallel	Footwall Mixed Zone	-2,85	-1,84
110	RN1.C7 R11	Deformed fault-parallel	Footwall Mixed Zone	-2,50	-1,59
111	RN1.C7 C1	Deformed fault-parallel	Footwall Mixed Zone	-1,95	-1,07
112	RN1.C7 C2	Deformed fault-parallel	Footwall Mixed Zone	-2,15	-0,88
113	RN1.C7 C3	Deformed fault-parallel	Footwall Mixed Zone	-2,19	-1,12
114	RN1.C7 C4	Deformed fault-parallel	Footwall Mixed Zone	-2,35	-1,60
115	RN1.C7 C5	Deformed fault-parallel	Footwall Mixed Zone	-2,20	-1,00
116	RN1.C7 C6	Deformed fault-parallel	Footwall Mixed Zone	-2,65	-1,38
117	RN1.C7 C7	Deformed fault-parallel	Footwall Mixed Zone	-3,04	-1,78
118	RN1.C8 R1	Deformed fault-parallel	Fault Core	-2,74	-1,35
119	RN1.C8 R2	Deformed fault-parallel	Fault Core	-2,62	-1,29
120	RN1.C8 R3	Deformed fault-parallel	Fault Core	-2,50	-1,45
121	RN1.C8 R4	Deformed fault-parallel	Fault Core	-2,42	-1,34
122	RN1.C8 R5	Deformed fault-parallel	Fault Core	-3,33	-1,88
123	RN1.C8 R6	Deformed fault-parallel	Fault Core	-2,93	-1,41
124	RN1.C8 R7	Deformed fault-parallel	Fault Core	-3,00	-1,89
125	RN1.C8 R8	Deformed fault-parallel	Fault Core	-3,16	-1,79
126	RN1.C8 R9	Deformed fault-parallel	Fault Core	-2,79	-1,65
127	RN1.C8 R10	Deformed fault-parallel	Fault Core	-2,59	-1,41
128	RN1.C8 C1	Deformed fault-parallel	Fault Core	-2,75	-1,44
129	RN1.C8 C2	Deformed fault-parallel	Fault Core	-3,13	-1,82
130	RN1.C8 C3	Deformed fault-parallel	Fault Core	-2,88	-1,68
131	RN1.C8 C4	Deformed fault-parallel	Fault Core	-2,73	-1,60
132	RN1.C8 C5	Deformed fault-parallel	Fault Core	-3,25	-1,73
133	RN1.C8 C6	Deformed fault-parallel	Fault Core	-2,84	-1,29
134	RN1.C8 C7	Deformed fault-parallel	Fault Core	-3,29	-1,44
135	RN1.C8B R1	Deformed fault-parallel	Fault Core	-3,17	-1,89
136	RN1.C8B R2	Deformed fault-parallel	Fault Core	-3,67	-1,00
137	RN1.C8B R3	Deformed fault-parallel	Fault Core	-2,68	-1,43
138	RN1.C8B R4	Deformed fault-parallel	Fault Core	-2,20	-1,16

139	RN1.C8B R5	Deformed fault-parallel	Fault Core	-2,25	-1,23
140	RN1.C8B R6	Deformed fault-parallel	Fault Core	-2,96	-0,90
141	RN1.C8B R7	Deformed fault-parallel	Fault Core	-3,01	-1,45
142	RN1.C8B R8	Deformed fault-parallel	Fault Core	-2,43	-1,31
143	RN1.C8B R9	Deformed fault-parallel	Fault Core	-2,94	-1,10
144	RN1.C8B C1	Deformed fault-parallel	Fault Core	-2,46	-0,96
145	RN1.C8B C2	Deformed fault-parallel	Fault Core	-2,58	-1,18
146	RN1.C8B C3	Deformed fault-parallel	Fault Core	-2,67	-1,54
147	RN1.C8B C4	Deformed fault-parallel	Fault Core	-2,94	-1,46
148	RN1.C8B C5	Deformed fault-parallel	Fault Core	-2,30	-1,16
149	RN1.C8B C6	Deformed fault-parallel	Fault Core	-2,71	-1,48
150	RN1.C8B C7	Deformed fault-parallel	Fault Core	-2,86	-1,40
151	RN1.C8B C8	Deformed fault-parallel	Fault Core	-2,51	-1,10
152	RN1.C8B C9	Deformed fault-parallel	Fault Core	-4,03	-1,07
153	RN1.C9 R1	Deformed fault-parallel	Fault Core	-5,02	-3,73
154	RN1.C9 R2	Deformed fault-parallel	Fault Core	-4,33	-4,18
155	RN1.C9 R3	Deformed fault-parallel	Fault Core	-3,82	-3,58
156	RN1.C9 R4	Deformed fault-parallel	Fault Core	-3,74	-4,35
157	RN1.C9 R5	Deformed fault-parallel	Fault Core	-3,07	-2,76
158	RN1.C9 R6	Deformed fault-parallel	Fault Core	-4,18	-3,83
159	RN1.C9 R7	Deformed fault-parallel	Fault Core	-3,09	-2,93
160	RN1.C9 R8	Deformed fault-parallel	Fault Core	-3,20	-3,00
161	RN1.C9 R9	Deformed fault-parallel	Fault Core	-3,18	-2,70
162	RN1.C9 R10	Deformed fault-parallel	Fault Core	-3,56	-4,01
163	RN1.C9 R11	Deformed fault-parallel	Fault Core	-3,38	-3,02
164	RN1.C9 C1	Deformed fault-parallel	Fault Core	-4,25	-6,82
165	RN1.C9 C2	Deformed fault-parallel	Fault Core	-4,35	-6,30
166	RN1.C9 C3	Deformed fault-parallel	Fault Core	-4,27	-5,13
167	RN1.C9 C4	Deformed fault-parallel	Fault Core	-3,97	-4,45
168	RN1.C9 C5	Deformed fault-parallel	Fault Core	-3,37	-3,25
169	RN1.C9 C6	Deformed fault-parallel	Fault Core	-3,20	-3,16
170	RN1.C9 C7	Deformed fault-parallel	Fault Core	-3,89	-3,03
171	RN1.C10 R1	Tabular fault-parallel	Footwall Damage Zone	-3,40	-2,70
172	RN1.C10 R2	Tabular fault-parallel	Footwall Damage Zone	-2,52	-1,91
173	RN1.C10 R3	Tabular fault-parallel	Footwall Damage Zone	-2,88	-2,26
174	RN1.C10 R4	Tabular fault-parallel	Footwall Damage Zone	-3,34	-2,56
175	RN1.C10 R5	Tabular fault-parallel	Footwall Damage Zone	-2,48	-1,82
176	RN1.C10 R6	Tabular fault-parallel	Footwall Damage Zone	-2,82	-2,22
177	RN1.C10 R7	Tabular fault-parallel	Footwall Damage Zone	-2,68	-1,47
178	RN1.C10 C1	Tabular fault-parallel	Footwall Damage Zone	-3,23	-1,16
179	RN1.C10 C2	Tabular fault-parallel	Footwall Damage Zone	-2,63	-1,29
180	RN1.C10 C3	Tabular fault-parallel	Footwall Damage Zone	-3,42	-2,83
181	RN1.C10 C4	Tabular fault-parallel	Footwall Damage Zone	-3,41	-2,58
182	RN1.C10 C5	Tabular fault-parallel	Footwall Damage Zone	-2,69	-2,65
183	RN1.C11 R1	Dissected-displaced	Footwall Mixed Zone	-2,55	-1,06
184	RN1.C11 R2	Dissected-displaced	Footwall Mixed Zone	-2,36	-0,85
185	RN1.C11 R3	Dissected-displaced	Footwall Mixed Zone	-2,93	-1,31

186	RN1.C11 R4	Dissected-displaced	Footwall Mixed Zone	-2,29	-1,06
187	RN1.C11 R5	Dissected-displaced	Footwall Mixed Zone	-2,13	-1,06
188	RN1.C11 R6	Dissected-displaced	Footwall Mixed Zone	-2,25	-0,97
189	RN1.C11 C1	Dissected-displaced	Footwall Mixed Zone	-2,40	-1,15
190	RN1.C11 C2	Dissected-displaced	Footwall Mixed Zone	-2,66	-1,40
191	RN1.C11 C3	Dissected-displaced	Footwall Mixed Zone	-2,86	-1,04
192	RN1.C11 C4	Dissected-displaced	Footwall Mixed Zone	-2,32	-0,92
193	RN1.C11 C5	Dissected-displaced	Footwall Mixed Zone	-2,22	-0,99
194	RN1.C11 C6	Dissected-displaced	Footwall Mixed Zone	-2,12	-0,92
195	RN1.C12 R1	Tabular fault-parallel	Footwall Damage Zone	-5,39	-8,52
196	RN1.C12 R2	Tabular fault-parallel	Footwall Damage Zone	-4,92	-9,34
197	RN1.C12 R3	Tabular fault-parallel	Footwall Damage Zone	-5,17	-10,35
198	RN1.C12 R4	Tabular fault-parallel	Footwall Damage Zone	-3,22	-2,34
199	RN1.C12 R5	Tabular fault-parallel	Footwall Damage Zone	-4,34	-3,52
200	RN1.C12 R6	Tabular fault-parallel	Footwall Damage Zone	-2,92	-2,60
201	RN1.C12 R7	Tabular fault-parallel	Footwall Damage Zone	-5,35	-8,42
202	RN1.C12 R8	Tabular fault-parallel	Footwall Damage Zone	-5,12	-7,16
203	RN1.C12 C1	Tabular fault-parallel	Footwall Damage Zone	-4,54	-3,92
204	RN1.C12 C2	Tabular fault-parallel	Footwall Damage Zone	-4,84	-4,91
205	RN1.C12 C3	Tabular fault-parallel	Footwall Damage Zone	-4,49	-3,91
206	RN1.C12 C4	Tabular fault-parallel	Footwall Damage Zone	-5,03	-4,57
207	RN1.C12 C5	Tabular fault-parallel	Footwall Damage Zone	-4,66	-4,77
208	RN1.C12 C6	Tabular fault-parallel	Footwall Damage Zone	-4,06	-3,99
209	RN1.C12 C7	Tabular fault-parallel	Footwall Damage Zone	-3,73	-2,96
210	RN1.C12 C8	Tabular fault-parallel	Footwall Damage Zone	-4,39	-3,53
211	RN1.C13 R1	Dissected-displaced	Footwall Mixed Zone	-3,28	-1,18
212	RN1.C13 R2	Dissected-displaced	Footwall Mixed Zone	-1,70	-0,55
213	RN1.C13 R3	Dissected-displaced	Footwall Mixed Zone	-1,69	-0,41
214	RN1.C13 R4	Dissected-displaced	Footwall Mixed Zone	-1,32	-0,54
215	RN1.C13 R5	Dissected-displaced	Footwall Mixed Zone	-1,52	-0,36
216	RN1.C13 R6	Dissected-displaced	Footwall Mixed Zone	-1,38	-0,34
217	RN1.C13 R7	Dissected-displaced	Footwall Mixed Zone	-1,70	-0,70
218	RN1.C13 R8	Dissected-displaced	Footwall Mixed Zone	-1,84	-0,31
219	RN1.C13 R9	Dissected-displaced	Footwall Mixed Zone	-2,69	-0,67
220	RN1.C13 R10	Dissected-displaced	Footwall Mixed Zone	-2,01	-0,38
221	RN.C13 C1	Dissected-displaced	Footwall Mixed Zone	-2,20	-0,51
222	RN.C13 C2	Dissected-displaced	Footwall Mixed Zone	-2,04	-0,56
223	RN.C13 C3	Dissected-displaced	Footwall Mixed Zone	-2,03	-0,68
224	RN.C13 C4	Dissected-displaced	Footwall Mixed Zone	-2,07	-0,59
225	RN.C13 C5	Dissected-displaced	Footwall Mixed Zone	-2,27	-0,66
226	RN.C13 C6	Dissected-displaced	Footwall Mixed Zone	-2,53	-0,37
227	RN.C13 C7	Dissected-displaced	Footwall Mixed Zone	-2,12	-0,43
228	RN.C13 C8	Dissected-displaced	Footwall Mixed Zone	-1,71	-0,40
229	RN.C13 C9	Dissected-displaced	Footwall Mixed Zone	-2,82	-1,01
230	RN.C13 C10	Dissected-displaced	Footwall Mixed Zone	-2,30	-0,75
231	RN1.C14 R1	Dissected-displaced	Fault Core	-3,67	-1,54
232	RN1.C14 R2	Dissected-displaced	Fault Core	-3,88	-1,52

233	RN1.C14 R3	Dissected-displaced	Fault Core	-4,40	-1,29
234	RN1.C14 R4	Dissected-displaced	Fault Core	-3,29	-1,38
235	RN1.C14 R5	Dissected-displaced	Fault Core	-3,34	-1,08
236	RN1.C14 R6	Dissected-displaced	Fault Core	-3,45	-1,20
237	RN1.C14 C1	Dissected-displaced	Fault Core	-3,75	-1,37
238	RN1.C14 C2	Dissected-displaced	Fault Core	-3,76	-1,32
239	RN1.C14 C3	Dissected-displaced	Fault Core	-3,23	-1,41
240	RN1.C14 C4	Dissected-displaced	Fault Core	-2,92	-1,46
241	RN1.C15 R1	Deformed fault-parallel	Fault Core	-3,67	-1,32
242	RN1.C15 R2	Deformed fault-parallel	Fault Core	-2,82	-1,57
243	RN1.C15 R3	Deformed fault-parallel	Fault Core	-2,87	-1,63
244	RN1.C15 R4	Deformed fault-parallel	Fault Core	-2,88	-1,25
245	RN1.C15 R5	Deformed fault-parallel	Fault Core	-3,75	-2,73
246	RN1.C15 R6	Deformed fault-parallel	Fault Core	-2,87	-1,22
247	RN1.C15 R7	Deformed fault-parallel	Fault Core	-3,16	-0,49
248	RN1.C15 R8	Deformed fault-parallel	Fault Core	-2,53	-1,23
249	RN1.C15 R9	Deformed fault-parallel	Fault Core	-2,64	-1,30
250	RN1.C15 R10	Deformed fault-parallel	Fault Core	-3,62	-1,70
251	RN1.C15 R11	Deformed fault-parallel	Fault Core	-2,84	-2,28
252	RN1.C15 R12	Deformed fault-parallel	Fault Core	-3,57	-1,82
253	RN1.C15 R13	Deformed fault-parallel	Fault Core	-2,79	-1,71
254	RN1.C15 R14	Deformed fault-parallel	Fault Core	-2,78	-0,98
255	RN1.C15 R15	Deformed fault-parallel	Fault Core	-2,86	-0,95
256	RN1.C15 R16	Deformed fault-parallel	Fault Core	-3,35	-1,17
257	RN1.C15 R17	Deformed fault-parallel	Fault Core	-2,97	-0,93
258	RN1.C15 R18	Deformed fault-parallel	Fault Core	-2,60	-1,27
259	RN1.C15 R19	Deformed fault-parallel	Fault Core	-3,08	-0,60
260	RN1.C15 R20	Deformed fault-parallel	Fault Core	-3,37	-1,44
261	RN1.C15 C1	Deformed fault-parallel	Fault Core	-3,27	-1,91
262	RN1.C15 C2	Deformed fault-parallel	Fault Core	-2,33	-1,40
263	RN1.C15 C3	Deformed fault-parallel	Fault Core	-3,35	-2,33
264	RN1.C15 C4	Deformed fault-parallel	Fault Core	-3,79	-2,73
265	RN1.C15 C5	Deformed fault-parallel	Fault Core	-3,64	-2,56
266	RN1.C15 C6	Deformed fault-parallel	Fault Core	-2,31	-0,78
267	RN1.C15 C7	Deformed fault-parallel	Fault Core	-2,25	-0,91
268	RN1.C15 C8	Deformed fault-parallel	Fault Core	-2,48	-0,86
269	RN1.C15 C9	Deformed fault-parallel	Fault Core	-2,09	-0,76
270	RN1.C1 1	Tabular fault-parallel	Low-deformation Zone	-6,09	-12,34
271	RN1.C1 2	Tabular fault-parallel	Low-deformation Zone	-6,19	-12,83
272	RN1.C1 3	Tabular fault-parallel	Low-deformation Zone	-6,07	-16,00
273	RN1.C1 4	Tabular fault-parallel	Low-deformation Zone	-6,01	-15,08
274	RN1.C1 5	Tabular fault-parallel	Low-deformation Zone	-6,16	-16,23
275	RN1.C2 1	Tabular fault-parallel	Low-deformation Zone	-7,00	-16,79
276	RN1.C2 2	Tabular fault-parallel	Low-deformation Zone	-5,58	-19,47
277	RN1.C2 3	Tabular fault-parallel	Low-deformation Zone	-8,45	-19,49
278	RN1.C2 4	Tabular fault-parallel	Low-deformation Zone	-5,60	-17,57
279	RN1.C2 5	Tabular fault-parallel	Low-deformation Zone	-5,16	-16,58

280	RN1.C3 1	Tabular fault-parallel	Low-deformation Zone	-5,74	-19,79
281	RN1.C3 2	Tabular fault-parallel	Low-deformation Zone	-5,16	-20,16
282	RN1.C3 3	Tabular fault-parallel	Low-deformation Zone	-5,78	-23,08
283	RN1.C3 4	Tabular fault-parallel	Low-deformation Zone	-6,02	-16,67
284	RN1.C3 5	Tabular fault-parallel	Low-deformation Zone	-5,94	-22,36
285	RN1.C4 1	Tabular erosive surface	Low-deformation Zone	-5,88	-9,49
286	RN1.C5A 1	Tabular fault-parallel	Footwall Damage Zone	-2,63	-1,13
287	RN1.C5B 1	Tabular fault-parallel	Footwall Damage Zone	-1,99	-1,19
288	RN1.C5C 1	Tabular fault-parallel	Footwall Damage Zone	-2,01	-0,87
289	RN1.C6 1	Tabular fault-parallel	Footwall Damage Zone	-2,82	-1,67
290	RN1.C6 2	Tabular fault-parallel	Footwall Damage Zone	-2,27	-1,29
291	RN1.C7A 1	Deformed fault-parallel	Footwall Mixed Zone	-1,93	-0,74
292	RN1.C7A 2	Deformed fault-parallel	Footwall Mixed Zone	-3,05	-1,36
293	RN1.C7B 1	Deformed fault-parallel	Footwall Mixed Zone	-2,02	-0,72
294	RN1.C7B 2	Deformed fault-parallel	Footwall Mixed Zone	-3,08	-1,30
295	RN1.C8 1	Deformed fault-parallel	Fault Core	-3,06	-1,68
296	RN1.C8B 1 1	Deformed fault-parallel	Fault Core	-2,66	-1,02
297	RN1.C8B 1 2	Deformed fault-parallel	Fault Core	-3,54	-1,41
298	RN1.C8B 2 1	Deformed fault-parallel	Fault Core	-3,25	-1,11
299	RN1.C8B 2 2	Deformed fault-parallel	Fault Core	-3,40	-1,53
300	RN1.C9A 1	Deformed fault-parallel	Fault Core	-3,81	-3,80
301	RN1.C9A 2	Deformed fault-parallel	Fault Core	-4,71	-3,39
302	RN1.C9A 3	Deformed fault-parallel	Fault Core	-4,80	-4,58
303	RN1.C9B 1	Deformed fault-parallel	Fault Core	-5,34	-7,11
304	RN1.C9B 2	Deformed fault-parallel	Fault Core	-4,71	-8,09
305	RN1.C10 1	Tabular fault-parallel	Footwall Mixed Zone	-3,26	-2,99
306	RN1.C10 2	Tabular fault-parallel	Footwall Mixed Zone	-3,64	-2,30
307	RN1.C10 3	Tabular fault-parallel	Footwall Mixed Zone	-2,94	-1,85
308	RN1.C11 1	Dissected-displaced	Footwall Damage Zone	-2,91	-0,90
309	RN1.C11 2	Dissected-displaced	Footwall Damage Zone	-2,99	-1,14
310	RN1.C12A 1	Tabular fault-parallel	Footwall Damage Zone	-2,41	-1,18
311	RN1.C12A 2	Tabular fault-parallel	Footwall Damage Zone	-4,12	-2,91
312	RN1.C12B 1	Tabular fault-parallel	Footwall Damage Zone	-2,75	-1,91
313	RN1.C12B 2	Tabular fault-parallel	Footwall Damage Zone	-5,35	-3,37
314	RN1.C13A 1	Dissected-displaced	Footwall Mixed Zone	-2,11	-0,16
315	RN1.C13A 2	Dissected-displaced	Footwall Mixed Zone	-2,11	-0,41
316	RN1.C13B 1	Dissected-displaced	Footwall Mixed Zone	-2,24	-0,22
317	RN1.C13B 2	Dissected-displaced	Footwall Mixed Zone	-2,07	-0,31
318	RN1.C13B 3	Dissected-displaced	Footwall Mixed Zone	-2,19	-0,16
319	RN1.C13B 4	Dissected-displaced	Footwall Mixed Zone	-2,02	-0,23
320	RN1.C13B 5	Dissected-displaced	Footwall Mixed Zone	-1,94	-0,32
321	RN1.C14 1	Dissected-displaced	Fault Core	-2,86	-1,60
322	RN1.C15A 1	Deformed fault-parallel	Fault Core	-3,02	-1,98
323	RN1.C15B 1	Deformed fault-parallel	Fault Core	-7,51	-2,31
324	RN1.C15C 1	Deformed fault-parallel	Fault Core	-2,44	-0,74

Table 2: complete isotopic data plotted in Fig. 10 subdivided between the concretions sampled through the Rocca di Neto fault zone.

TABLE 3: STATISTICAL ANALYSIS OF ISOTOPIC DATA SETS

LDZ vs FDZ

	LDZ $\delta^{13}C$ (‰ V-PDB)	FDZ $\delta^{13}C$ (‰ V-PDB)	LDZ $\delta^{18}O$ (‰ V-PDB)	FDZ $\delta^{18}O$ (‰ V-PDB)
Data N	84	58	84	58
Mean (‰)	-13.853	-2.437	-5.468	-3.067
Standard Error	0.521	0.303	0.112	0.153
Standard Deviation	4.778	2.306	1.029	1.166
Shapiro-Wilk p(normal)	0.953 (95.3%)	0.742 (74.2%)	0.808 (80.8%)	0.913 (91.3%)
F test p(same var) (%)	3.7E-6		29.8	
t test p(same mean) (%)	7.7E-37		2.4E-21	

LDZ vs FMZ

	LDZ $\delta^{13}C$ (‰ V-PDB)	FMZ $\delta^{13}C$ (‰ V-PDB)	LDZ $\delta^{18}O$ (‰ V-PDB)	FMZ $\delta^{18}O$ (‰ V-PDB)
Data N	84	76	84	76
Mean (‰)	-13.853	-1.114	-5.468	-2.389
Standard Error	0.521	0.080	0.112	0.059
Standard Deviation	4.778	0.696	1.029	0.512
Shapiro-Wilk p(normal)	0.953 (95.3%)	0.919 (91.9%)	0.808 (80.8%)	0.97 (97%)
F test p(same var) (%)	2.3E-41		4.1E-7	
t test p(same mean) (%)	2.6E-38		4.9E-47	

LDZ vs FC

	LDZ $\delta^{13}C$ (‰ V-PDB)	FC $\delta^{13}C$ (‰ V-PDB)	LDZ $\delta^{18}O$ (‰ V-PDB)	FC $\delta^{18}O$ (‰ V-PDB)
Data N	84	106	84	106
Mean (‰)	-13.853	-2.030	-5.468	-3.250
Standard Error	0.521	0.136	0.112	0.075
Standard Deviation	4.778	1.403	1.029	0.776
Shapiro-Wilk p(normal)	0.953 (95.3%)	0.746 (74.6%)	0.808 (80.8%)	0.864 (86.4%)
F test p(same var) (%)	8.1E-27		0.62	
t test p(same mean) (%)	7.8E-37		2.6E-33	

FDZ vs FMZ

	FDZ $\delta^{13}C$ (‰ V-PDB)	FMZ $\delta^{13}C$ (‰ V-PDB)	FDZ $\delta^{18}O$ (‰ V-PDB)	FMZ $\delta^{18}O$ (‰ V-PDB)
Data N	58	76	58	76
Mean (‰)	-2.437	-1.114	-3.067	-2.389
Standard Error	0.303	0.080	0.153	0.059
Standard Deviation	2.306	0.696	1.166	0.512
Shapiro-Wilk p(normal)	0.742 (74.2%)	0.919 (91.9%)	0.913 (91.3%)	0.97 (97%)
F test p(same var) (%)	3.3E-18		8.2E-9	
t test p(same mean) (%)	7.6E-3		9.3E-3	

FDZ vs FC

	FDZ $\delta^{13}C$ (‰ V-PDB)	FC $\delta^{13}C$ (‰ V-PDB)	FDZ $\delta^{18}O$ (‰ V-PDB)	FC $\delta^{18}O$ (‰ V-PDB)
Data N	58	106	58	106
Mean (‰)	-2.437	-2.030	-3.067	-3.250
Standard Error	0.303	0.136	0.153	0.075
Standard Deviation	2.306	1.403	1.166	0.776
Shapiro-Wilk p(normal)	0.742 (74.2%)	0.746 (74.6%)	0.913 (91.3%)	0.864 (86.4%)
F test p(same var) (%)	1.1E-3		0.03	
t test p(same mean) (%)	22.3		28.6	

FMZ vs FC

	FMZ $\delta^{13}C$ (‰ V-PDB)	FC $\delta^{13}C$ (‰ V-PDB)	FMZ $\delta^{18}O$ (‰ V-PDB)	FC $\delta^{18}O$ (‰ V-PDB)
Data N	76	106	76	106
Mean (‰)	-1.114	-2.030	-2.389	-3.250
Standard Error	0.080	0.136	0.059	0.075
Standard Deviation	0.696	1.403	0.512	0.776
Shapiro-Wilk p(normal)	0.919 (91.9%)	0.746 (74.6%)	0.97 (97%)	0.864 (86.4%)
F test p(same var) (%)	1.2E-7		0.02	
t test p(same mean) (%)	3.3E-6		3.1E-14	

Table 3: statistical tests to evaluate differences and similarities between isotopic data sets ($\delta^{13}C$ and $\delta^{18}O$) from the structural domains composing the fault zone. Prior to the tests, the probability to have normal Gaussian data distribution was checked (Shapiro-Wilk test). The probability to gain the same variance from the data sets was tested via F test. Eventually, t-Student test (with different variance) was adopted to check the probability to obtain the same mean from two different data sets. Isotopic data sets were cross-checked in pairs to evaluate the similarities between every possible combination.

TABLE 4: ISOTOPIC COMPOSITION OF CEMENTING FLUIDS

Fractionation formula of Friedman and O'Neil (1977)				
Starting temperature of surficial fluids T = 10°C				
Maximum burial depth = 500 m				
Geothermal gradient assumed for the Crotone Basin = 20°C/Km				
Temperature increment with depth = 10°C				
Range and mean of $\delta^{18}O$ (‰ V-PDB) from calcite cement				
Domain	LDZ	FDZ	FMZ	FC
Range	(-8.45; -1.55)	(-5.39; -1.25)	(-3.64; -1.32)	(-7.51; -2.09)
Mean	-5.47	-3.07	-2.39	-3.25
Range and mean of $\delta^{18}O$ (‰ V-SMOW) of the cementing fluids				
Domain	LDZ	FDZ	FMZ	FC
Range	(-7.44; -0.54)	(-4.38; -0.24)	(-2.63; -0.32)	(-6.51; -1.08)
Mean	-4.46	-2.06	-1.38	-2.24

Table 4: results of the back-calculation of the $\delta^{18}O$ composition of the cementing fluids according to the fractionation formula of Friedman and O'Neil (1977) for water-calcite system. Data are reported also in the main text and compared with the expected isotopic composition of meteoric and marine water for the Crotone Basin area (Balsamo et al., 2012; Giustini et al., 2016).

REFERENCES CITED

Balsamo, F., Storti, F., Gröcke, D., 2012. Fault-related fluid flow history in shallow marine sediments from carbonate concretions, Crotone basin, south Italy. Journal of the Geological Society, London 169, 613–626. https://doi.org/10.1144/0016-76492011-109.

Friedman, I., O'Neil, J.R., 1977. Compilation of stable isotope fractionation factors of geochemical interest. Geological Survey Professional Paper 440, 1–117. https://doi.org/10.1016/S0016-0032(20)90415-5

Giustini, F., Brilli, M., Patera, A., 2016. Mapping oxygen stable isotopes of precipitation in Italy. Journal of Hydrology: Regional Studies 8, 162–181. https://doi.org/10.1016/j.ejrh.2016.04.001