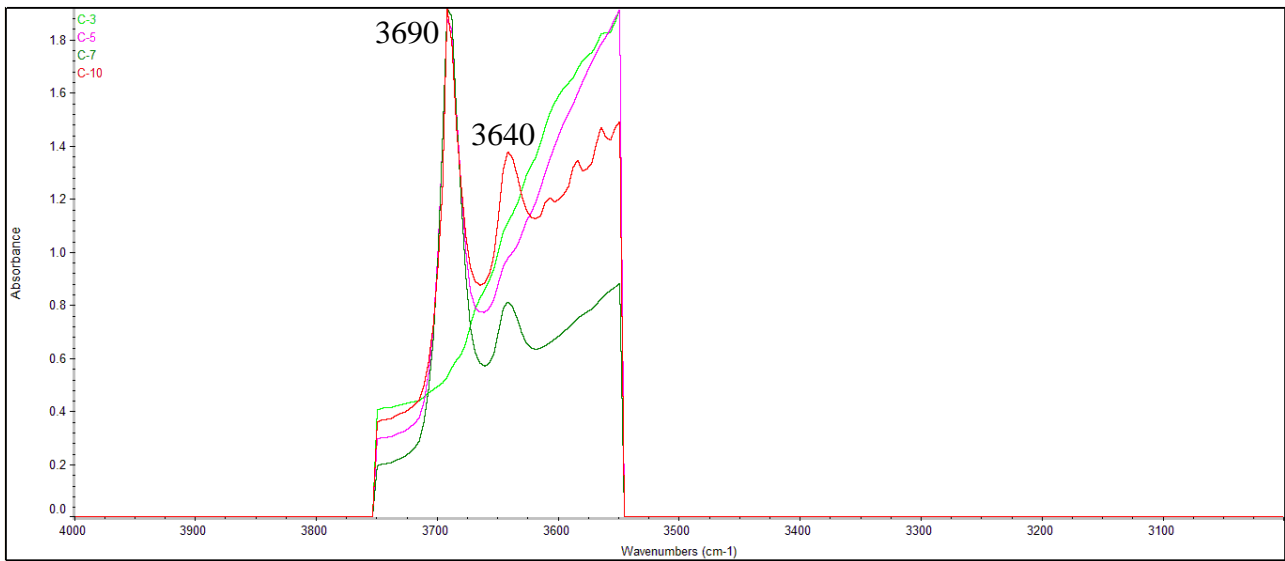


**Supplementary Table S1.** Background measurements on marble from Ness Ziona (Israel), including laboratory number, CO<sub>2</sub> recovery method, sample size, pMC and <sup>14</sup>C age.

Lab nr	Fraction	Size (mg of carbon)	pMC	<sup>14</sup> C age ± 1σ BP
RTD9116	Hydrolysis	1.02	0.179±0.012	50826±544
RTD9116	Hydrolysis	0.19	0.488±0.022	42763±366
RTD9116	Hydrolysis	0.19	0.304±0.018	46563±481
RTD8043	Hydrolysis	0.66	0.219±0.014	49200±525
RTD8043	Hydrolysis	0.97	0.177±0.011	50886±495
RTD8554	Hydrolysis	1.07	0.197±0.011	50063±468
RTD8554	Hydrolysis	0.97	0.162±0.01	51600±520
RTD9311	Hydrolysis	1	0.171±0.01	51173±491
RTD8949	Hydrolysis	0.18	0.313±0.018	46331±470
RTD8949	Hydrolysis	0.18	0.523±0.019	42207±289
RTD8949	Hydrolysis	0.13	0.462±0.025	43190±453
RTD8949	Hydrolysis	0.21	0.281±0.017	47204±503
RTD8949	Hydrolysis	1.02	0.134±0.007	53146±421
RTD8985	Hydrolysis	0.03	1.359±0.139	34527±864
RTD8985	Hydrolysis	0.41	0.276±0.014	47339±413
RTD8985	Hydrolysis	0.06	1.628±0.124	33080±637
RTD8985	Hydrolysis	1.02	0.197±0.006	50048±256
RTD8589	Hydrolysis	1.05	0.171±0.012	51176±581
RTD8589	Hydrolysis	0.22	0.248±0.02	48183±689
RTD8589	Hydrolysis	0.17	0.304±0.023	46549±635
RTD8681	Hydrolysis	1	0.117±0.012	54252±842
RTD8747	Hydrolysis	1	0.165±0.016	51455±797
RTD8877	Hydrolysis	1	0.193±0.023	50189±1001
RTD9416	600 °C	0.15	0.384±0.032	44684±696
RTD9416	700 °C	1.02	0.139±0.01	52870±590
RTD9416	700 °C	0.3	0.177±0.015	50916±691
RTD9416	700 °C	1	0.109±0.012	54789±907
RTD9416	700 °C	0.21	0.307±0.036	46487±1005
RTD9416	700 °C	0.2	0.221±0.028	49111±1083
RTD9416	700 °C	0.32	0.129±0.018	53441±1174
RTD10022	700 °C	0.1	0.473±0.028	43012±495
RTD10022	700 °C	0.1	0.336±0.021	45744±505
RTD10022	700 °C	0.1	0.346±0.02	45514±483
RTD10022	700 °C	0.2	0.26±0.02	47817±640
RTD8644	700 °C	0.87	0.435±0.023	43682±433
RTD8644	700 °C	0.13	0.606±0.029	41014±391
RTD9049	700 °C	0.87	0.184±0.011	50582±489
RTD9049	700 °C	0.13	0.457±0.039	43276±713
RTD8682	700 °C	0.58	0.15±0.014	52206±755
RTD8682	700 °C	0.32	0.225±0.019	48971±696
RTD8682	700 °C	0.2	0.316±0.035	46255±928
RTD9842	700 °C	0.48	0.273±0.011	47418±329
RTD9842	700 °C	0.12	0.894±0.071	37889±329
RTD9842	700 °C	0.23	0.284±0.017	47109±479
RTD9887	700 °C	0.33	0.184±0.011	50608±477
RTD9049	800°C	0.1	0.404±0.045	44280±937
RTD9049	800°C	1	0.103±0.007	55216±551
RTD8682	800°C	1	0.293±0.025	46846±727
RTD8644	800°C	1.02	0.127±0.01	53598±681
RTD8644	800°C	0.4	0.176±0.012	50928±563
RTD8644	900 °C	1.1	0.099±0.014	55595±1204
RTD8682	900 °C	1	0.124±0.017	53784±1153

**Supplementary Figure S1.**



**Supplementary Figure S1.** Representative transmission FTIR spectra collected from the KW4213 thin section, showing variability in the occurrence of brucite (peak at  $3690\text{ cm}^{-1}$ ) and portlandite (peak at  $3640\text{ cm}^{-1}$ ).