Table S1. Physicochemical measurements and ionic composition of an ephemeral stream and two piedmont sources.

System	Ephemeral stream	Piedmont spring	Piedmont spring
Coordinates	-21.63521 N; -67.75753 W	-21.69665 N; -67.8098 W	-21.6996 N ; -67.85628 W
Temperature (°C)	17.3	16.4	32.4
pH	9.15	7.99	6.35
Conductivity	0.09	0.22	3.21
Alcalinity (meq.L^{-1})	10.7	0.78	4.35
Na^{+}	13	27	545
K^{+}	5.6	14	69
Ca^{++}	6.8	15	27
Mg^{++}	3.1	4.4	8.6
SO_4^{--}	4.1	21	74
Cl^{-}	26	54	903
HCO_3^{-}	54.3	46.5	104.8
Li^{+}	0.11	2.2	7.2
Sr^{++}	0.07	0.27	0.55
Ba^{++}	0.19	<0.01	0.035
Fe	0.42	<0.04	0.37
B	0.4	0.89	5.5
Si	17	28	47
Br^{-}	0.5	<0.5	<0.5

Table S2. $CaCO_3$ content and Ca/Si ratio in microbialites and mud

Sample	Structure	$CaCO_3$ (%)	Ca/Si ratio	Mean Ca/Si ratio
PG1-2	Ledge	47.60810402	0.427235183 0.10406222 0.794332977 0.294250115	0.404970124
PG1-6	Mushroom-like	66.02549765	2.593069996 3.137113055 2.358961512	2.696381521
PG1-11	Cerebroid	68.47450256	1.459514924 2.563614129 3.82684258	2.616657211
PG1-14	Cerebroid	72.17943292	4.501820627 1.851502577 1.774508072 1.987780476	2.528902938
PG1-18	Shrub	71.25111974	2.069886612 5.708604911	3.564236079
PG17-16	Shrub	75.69230769	2.573867355 3.904585435	
PG1-5	Mud	43.34958293	0.442574605 0.377456318 0.13802443	0.319351784
PG1-8	Mud	45.43842158	0.395092183 0.410367746 0.331423563	0.378961164
PG1-11	Mud	80.39215686	1.620217526 1.392454612 1.745067944	1.506336069
PG1-10	Mud	75	1.576540512 1.512226765 1.832618568	1.666613447
PG1-12	Mud	65.92964824	0.780169968 0.768399162 0.783228498 0.792130431	0.780982015
PG1-13	Mud	47.43529412	0.643422086 0.647175358 0.669725483	0.653440976
PG2-45	Mud	70.09702028	1.040918579 0.922234469	0.981576524

Figure S1. Estimated mud volcano eruption depending on epicentral distance and magnitude of regional recorded earthquakes, compared to empirical liquefaction boundaries defined by Wang et al. [90] (2005) (red line) and Wang et al. [91] (interval between line of dots). Credit: U.S. Geological Survey, Earthquake Hazards Program.