David C Catling

List of Publications by Year
in descending order

146 papers	11,725 citations	25034 57 h-index	30087 103 g-index
156 all docs	156 docs citations	156 times ranked	7236 citing authors

#	Article	IF	Citations
1	Detection of Perchlorate and the Soluble Chemistry of Martian Soil at the Phoenix Lander Site. Science, 2009, 325, 64-67.	12.6	913
2	H ₂ O at the Phoenix Landing Site. Science, 2009, 325, 58-61.	12.6	500
3	Evolution of a Habitable Planet. Annual Review of Astronomy and Astrophysics, 2003, 41, 429-463.	24.3	436
4	Biogenic Methane, Hydrogen Escape, and the Irreversible Oxidation of Early Earth. Science, 2001, 293, 839-843.	12.6	426
5	How Earth's atmosphere evolved to an oxic state: A status report. Earth and Planetary Science Letters, 2005, 237, 1-20.	4.4	329
6	Evidence for Calcium Carbonate at the Mars Phoenix Landing Site. Science, 2009, 325, 61-64.	12.6	300
7	Why O2Is Required by Complex Life on Habitable Planets and the Concept of Planetary "Oxygenation Time". Astrobiology, 2005, 5, 415-438.	3.0	276
8	The Archean atmosphere. Science Advances, 2020, 6, eaax1420.	10.3	276
9	The Ultraviolet Environment of Mars: Biological Implications Past, Present, and Future. Icarus, 2000, 146, 343-359.	2.5	272
10	The loss of mass-independent fractionation in sulfur due to a Palaeoproterozoic collapse of atmospheric methane. Geobiology, 2006, 4, 271-283.	2.4	246
11	Atmospheric origins of perchlorate on Mars and in the Atacama. Journal of Geophysical Research, 2010, 115, .	3.3	245
12	Alteration Assemblages in Martian Meteorites: Implications for Near-Surface Processes. Space Science Reviews, 2001, 96, 365-392.	8.1	210
13	Constraining the climate and ocean pH of the early Earth with a geological carbon cycle model. Proceedings of the National Academy of Sciences of the United States of America, 2018, 115, 4105-4110.	7.1	203
14	THE EVOLUTION OF SOLAR FLUX FROM 0.1 nm TO 160 Î¼m: QUANTITATIVE ESTIMATES FOR PLANETARY STUDIES. Astrophysical Journal, 2012, 757, 95.	4.5	192
15	Is there methane on Mars?. Icarus, 2011, 212, 493-503.	2.5	178
16	Discovery of Natural Perchlorate in the Antarctic Dry Valleys and Its Global Implications. Environmental Science & Technology, 2010, 44, 2360-2364.	10.0	167
17	Air density 2.7 billion years ago limited to less than twice modern levels by fossil raindrop imprints. Nature, 2012, 484, 359-362.	27.8	167
18	Biogeochemical modelling of the rise in atmospheric oxygen. Geobiology, 2006, 4, 239-269.	2.4	156

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19	Oxidant Enhancement in Martian Dust Devils and Storms: Implications for Life and Habitability. Astrobiology, 2006, 6, 439-450.	3.0	144
20	The nature of coarse-grained crystalline hematite and its implications for the early environment of Mars. Icarus, 2003, 165, 277-300.	2.5	140
21	Exoplanet Biosignatures: A Framework for Their Assessment. Astrobiology, 2018, 18, 709-738.	3.0	139
22	Possible physical and thermodynamical evidence for liquid water at the Phoenix landing site. Journal of Geophysical Research, 2009, 114, .	3.3	137
23	The Cosmic Shoreline: The Evidence that Escape Determines which Planets Have Atmospheres, and what this May Mean for Proxima Centauri B. Astrophysical Journal, 2017, 843, 122.	4.5	134
24	Earth's air pressure 2.7 billion years ago constrained to less than half of modern levels. Nature Geoscience, 2016, 9, 448-451.	12.9	132
25	A statistical analysis of the carbon isotope record from the Archean to Phanerozoic and implications for the rise of oxygen. Numerische Mathematik, 2015, 315, 275-316.	1.4	130
26	Geochemistry of Carbonates on Mars: Implications for Climate History and Nature of Aqueous Environments. Space Science Reviews, 2013, 174, 301-328.	8.1	126
27	A chemical model for evaporites on early Mars: Possible sedimentary tracers of the early climate and implications for exploration. Journal of Geophysical Research, 1999, 104, 16453-16469.	3.3	121
28	Wet Chemistry experiments on the 2007 Phoenix Mars Scout Lander mission: Data analysis and results. Journal of Geophysical Research, 2010, 115, .	3.3	119
29	Ultraviolet radiation on the surface of Mars and the Beagle 2 UV sensor. Planetary and Space Science, 2002, 50, 915-927.	1.7	118
30	Contributions to late Archaean sulphur cycling by life on land. Nature Geoscience, 2012, 5, 722-725.	12.9	118
31	A Two-Tiered Approach to Assessing the Habitability of Exoplanets. Astrobiology, 2011, 11, 1041-1052.	3.0	117
32	Photochemical instability of the ancient Martian atmosphere. Journal of Geophysical Research, 2008, 113, .	3.3	115
33	Disequilibrium biosignatures over Earth history and implications for detecting exoplanet life. Science Advances, 2018, 4, eaao5747.	10.3	111
34	Strange messenger: A new history of hydrogen on Earth, as told by Xenon. Geochimica Et Cosmochimica Acta, 2019, 244, 56-85.	3.9	109
35	Geochemical Consequences of Widespread Clay Mineral Formation in Marsâ€™ Ancient Crust. Space Science Reviews, 2013, 174, 329-364.	8.1	108
36	The formation of sulfate, nitrate and perchlorate salts in the martian atmosphere. Icarus, 2014, 231, 51-64.	2.5	108

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37	The formation of supercooled brines, viscous liquids, and low-temperature perchlorate glasses in aqueous solutions relevant to Mars. Icarus, 2014, 233, 36-47.	2.5	103
38	Modeling aqueous perchlorate chemistries with applications to Mars. Icarus, 2010, 207, 675-685.	2.5	102
39	Photochemical and climate consequences of sulfur outgassing on early Mars. Earth and Planetary Science Letters, 2010, 295, 412-418.	4.4	102
40	A carbonate-rich lake solution to the phosphate problem of the origin of life. Proceedings of the National Academy of Sciences of the United States of America, 2020, 117, 883-888.	7.1	101
41	Creation and Evolution of Impact-generated Reduced Atmospheres of Early Earth. Planetary Science Journal, 2020, 1, 11.	3.6	101
42	Detectability of Biosignatures in Anoxic Atmospheres with the James Webb Space Telescope: A TRAPPIST-1e Case Study. Astronomical Journal, 2018, 156, 114.	4.7	98
43	Soluble sulfate in the martian soil at the Phoenix landing site. Geophysical Research Letters, 2010, 37, .	4.0	96
44	Oxidant Enhancement in Martian Dust Devils and Storms: Storm Electric Fields and Electron Dissociative Attachment. Astrobiology, 2006, 6, 451-462.	3.0	94
45	On Detecting Biospheres from Chemical Thermodynamic Disequilibrium in Planetary Atmospheres. Astrobiology, 2016, 16, 39-67.	3.0	94
46	Modeling aqueous ferrous iron chemistry at low temperatures with application to Mars. Geochimica Et Cosmochimica Acta, 2003, 67, 4251-4266.	3.9	90
47	Constraining climate sensitivity and continental versus seafloor weathering using an inverse geological carbon cycle model. Nature Communications, 2017, 8, 15423.	12.8	88
48	Light-toned layered deposits in Juventae Chasma, Mars. Icarus, 2006, 181, 26-51.	2.5	82
49	Habitability of the Phoenix landing site. Journal of Geophysical Research, 2010, 115, .	3.3	82
50	AN ANALYTIC RADIATIVE-CONVECTIVE MODEL FOR PLANETARY ATMOSPHERES. Astrophysical Journal, 2012, 757, 104.	4.5	82
51	Western boundary currents in the Martian atmosphere: Numerical simulations and observational evidence. Journal of Geophysical Research, 1995, 100, 5485.	3.3	81
52	Modeling ferrousâ€“ferric iron chemistry with application to martian surface geochemistry. Geochimica Et Cosmochimica Acta, 2008, 72, 242-266.	3.9	80
53	Selenium isotope evidence for progressive oxidation of the Neoproterozoic biosphere. Nature Communications, 2015, 6, 10157.	12.8	72
54	The sustainability of habitability on terrestrial planets: Insights, questions, and needed measurements from Mars for understanding the evolution of Earthâ€like worlds. Journal of Geophysical Research E: Planets, 2016, 121, 1927-1961.	3.6	72

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55	Effects of pressure on aqueous chemical equilibria at subzero temperatures with applications to Europa. Geochimica Et Cosmochimica Acta, 2005, 69, 259-274.	3.9	67
56	The evolution of the global selenium cycle: Secular trends in Se isotopes and abundances. Geochimica Et Cosmochimica Acta, 2015, 162, 109-125.	3.9	59
57	Deep Space 2: The Mars Microprobe Mission. Journal of Geophysical Research, 1999, 104, 27013-27030.	3.3	58
58	Temperature, pressure, and wind instrumentation in the Phoenix meteorological package. Journal of Geophysical Research, 2008, 113, .	3.3	58
59	Common 0.1â€‰bar tropopause in thick atmospheres set by pressure-dependent infrared transparency. Nature Geoscience, 2014, 7, 12-15.	12.9	58
60	Modeling ammoniaâ€“ammonium aqueous chemistries in the Solar Systemâ€™s icy bodies. Icarus, 2012, 220, 932-946.	2.5	56
61	Exoplanet Biosignatures: At the Dawn of a New Era of Planetary Observations. Astrobiology, 2018, 18, 619-629.	3.0	54
62	The Planetary Air Leak. Scientific American, 2009, 300, 36-43.	1.0	51
63	Soluble salts at the Phoenix Lander site, Mars: A reanalysis of the Wet Chemistry Laboratory data. Geochimica Et Cosmochimica Acta, 2014, 136, 142-168.	3.9	51
64	Consequences of Giant Impacts on Early Uranus for Rotation, Internal Structure, Debris, and Atmospheric Erosion. Astrophysical Journal, 2018, 861, 52.	4.5	51
65	Anaerobic methanotrophy and the rise of atmospheric oxygen. Philosophical Transactions Series A, Mathematical, Physical, and Engineering Sciences, 2007, 365, 1867-1888.	3.4	50
66	The rise of oxygen and the hydrogen hourglass. Chemical Geology, 2013, 362, 26-34.	3.3	50
67	Alkaline lake settings for concentrated prebiotic cyanide and the origin of life. Geochimica Et Cosmochimica Acta, 2019, 260, 124-132.	3.9	49
68	A warm or a cold early Earth? New insights from a 3-D climate-carbon model. Earth and Planetary Science Letters, 2017, 474, 97-109.	4.4	45
69	Atmospheric hydrogen peroxide and Eoarchean iron formations. Geobiology, 2015, 13, 1-14.	2.4	42
70	Topographic, spectral and thermal inertia analysis of interior layered deposits in Iani Chaos, Mars. Icarus, 2012, 221, 20-42.	2.5	40
71	Water activities of NaClO4, Ca(ClO4)2, and Mg(ClO4)2 brines from experimental heat capacities: Water activity >0.6 below 200 K. Geochimica Et Cosmochimica Acta, 2016, 181, 164-174.	3.9	37
72	Probable Cold and Alkaline Surface Environment of the Hadean Earth Caused by Impact Ejecta Weathering. Geochemistry, Geophysics, Geosystems, 2020, 21, e2019GC008734.	2.5	37

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73	Mantle data imply a decline of oxidizable volcanic gases could have triggered the Great Oxidation. Nature Communications, 2020, 11, 2774.	12.8	36
74	On Earth, as it is on Mars?. Nature, 2004, 429, 707-708.	27.8	34
75	Selenium isotope analysis of organic-rich shales: advances in sample preparation and isobaric interference correction. Journal of Analytical Atomic Spectrometry, 2013, 28, 1734.	3.0	34
76	High-sensitivity silicon capacitive sensors for measuring medium-vacuum gas pressures. Sensors and Actuators A: Physical, 1998, 64, 157-164.	4.1	33
77	A revised Pitzer model for low-temperature soluble salt assemblages at the Phoenix site, Mars. Geochimica Et Cosmochimica Acta, 2015, 166, 327-343.	3.9	33
78	Br/Cl partitioning in chloride minerals in the Burns formation on Mars. Icarus, 2009, 200, 436-445.	2.5	32
79	Rocky Worlds Limited to â^¼1.8 Earth Radii by Atmospheric Escape during a Starâ€™s Extreme UV Saturation. Astrophysical Journal, 2017, 845, 130.	4.5	32
80	The Productivity of Oxygenic Photosynthesis around Cool, M Dwarf Stars. Astrophysical Journal, 2018, 859, 171.	4.5	32
81	A coupled carbon-silicon cycle model over Earth history: Reverse weathering as a possible explanation of a warm mid-Proterozoic climate. Earth and Planetary Science Letters, 2020, 537, 116181.	4.4	32
82	IS THE PALE BLUE DOT UNIQUE? OPTIMIZED PHOTOMETRIC BANDS FOR IDENTIFYING EARTH-LIKE EXOPLANETS. Astrophysical Journal, 2016, 817, 31.	4.5	31
83	Key Science Questions from the Second Conference on Early Mars: Geologic, Hydrologic, and Climatic Evolution and the Implications for Life. Astrobiology, 2005, 5, 663-689.	3.0	30
84	Modeling salt precipitation from brines on Mars: Evaporation versus freezing origin for soil salts. Icarus, 2015, 250, 451-461.	2.5	28
85	Packaging a piezoresistive pressure sensor to measure low absolute pressures over a wide sub-zero temperature range. Sensors and Actuators A: Physical, 2000, 83, 142-149.	4.1	27
86	A Low-Temperature Thermodynamic Model for the Na-K-Ca-Mg-Cl System Incorporating New Experimental Heat Capacities in KCl, MgCl₂, and CaCl₂ Solutions. Journal of Chemical & Engineering Data, 2017, 62, 995-1010.	1.9	27
87	Chlorate brines on Mars: Implications for the occurrence of liquid water and deliquescence. Earth and Planetary Science Letters, 2018, 497, 161-168.	4.4	26
88	Abundant Atmospheric Methane from Volcanism on Terrestrial Planets Is Unlikely and Strengthens the Case for Methane as a Biosignature. Planetary Science Journal, 2020, 1, 58.	3.6	26
89	A Micro-Meteorological mission for global network science on Mars: rationale and measurement requirements. Planetary and Space Science, 1996, 44, 1361-1383.	1.7	25
90	Hematitic concretions at Meridiani Planum, Mars: Their growth timescale and possible relationship with iron sulfates. Earth and Planetary Science Letters, 2008, 269, 366-376.	4.4	25

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91	The geochemistry of Don Juan Pond: Evidence for a deep groundwater flow system in Wright Valley, Antarctica. Earth and Planetary Science Letters, 2017, 474, 190-197.	4.4	25
92	Modeling gas hydrate equilibria in electrolyte solutions. Calphad: Computer Coupling of Phase Diagrams and Thermochemistry, 2006, 30, 248-259.	1.6	24
93	A perchlorate brine lubricated deformable bed facilitating flow of the north polar cap of Mars: Possible mechanism for water table recharging. Journal of Geophysical Research, 2010, 115, .	3.3	24
94	Anoxic atmospheres on Mars driven by volcanism: Implications for past environments and life. Icarus, 2017, 290, 46-62.	2.5	24
95	Planetary atmospheres and life. , 0, , 91-116.		24
96	Western boundary currents in the atmosphere of Mars. Nature, 1994, 367, 548-551.	27.8	23
97	Modeling hot spring chemistries with applications to martian silica formation. Icarus, 2011, 212, 629-642.	2.5	23
98	Analysis of mass dependent and mass independent selenium isotope variability in black shales. Journal of Analytical Atomic Spectrometry, 2014, 29, 1648-1659.	3.0	23
99	Carbon cycle inverse modeling suggests large changes in fractional organic burial are consistent with the carbon isotope record and may have contributed to the rise of oxygen. Geobiology, 2021, 19, 342-363.	2.4	23
100	Where are Marsâ€™ Hypothesized Ocean Shorelines? Large Lateral and Topographic Offsets Between Different Versions of Paleoshoreline Maps. Journal of Geophysical Research E: Planets, 2021, 126, e2020JE006486.	3.6	23
101	Observations of atmospheric tides on Mars at the season and latitude of the Phoenix atmospheric entry. Geophysical Research Letters, 2010, 37, .	4.0	22
102	Carbonate-silicate cycle predictions of Earth-like planetary climates and testing the habitable zone concept. Nature Communications, 2020, 11, 6153.	12.8	22
103	Atmospheric CO ₂ levels from 2.7 billion years ago inferred from micrometeorite oxidation. Science Advances, 2020, 6, eaay4644.	10.3	22
104	Sulfiteâ€“sulfideâ€“sulfateâ€“carbonate equilibria with applications to Mars. Icarus, 2013, 225, 342-351.	2.5	21
105	Statistical analysis of Curiosity data shows no evidence for a strong seasonal cycle of martian methane. Icarus, 2020, 336, 113407.	2.5	21
106	A Maximum Subsurface Biomass on Mars from Untapped Free Energy: CO and H₂as Potential Antibiosignatures. Astrobiology, 2019, 19, 655-668.	3.0	19
107	Potential aeolian deposition of intra-crater layering: A case study of Henry crater, Mars. Bulletin of the Geological Society of America, 2020, 132, 608-616.	3.3	19
108	Quantitative Highâ€Resolution Reexamination of a Hypothesized Ocean Shoreline in Cydonia Mensae on Mars. Journal of Geophysical Research E: Planets, 2019, 124, 316-336.	3.6	18

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109	High Organic Burial Efficiency Is Required to Explain Mass Balance in Earth's Early Carbon Cycle. Global Biogeochemical Cycles, 2021, 35, .	4.9	17
110	Dune Casts Preserved by Partial Burial: The First Identification of <i>Ghost Dune</i> Pits on Mars. Journal of Geophysical Research E: Planets, 2018, 123, 1431-1448.	3.6	16
111	When is Chemical Disequilibrium in Earth-like Planetary Atmospheres a Biosignature versus an Anti-biosignature? Disequilibria from Dead to Living Worlds. Astrophysical Journal, 2020, 892, 127.	4.5	16
112	Atmospheric Erosion by Giant Impacts onto Terrestrial Planets: A Scaling Law for any Speed, Angle, Mass, and Density. Astrophysical Journal Letters, 2020, 901, L31.	8.3	16
113	Ancient fingerprints in the clay. Nature, 2007, 448, 31-32.	27.8	14
114	Atmospheric oxygenation and volcanism. Nature, 2012, 487, E1-E1.	27.8	14
115	A Low-Temperature Aqueous Thermodynamic Model for the Naâ€“Kâ€“Caâ€“Mgâ€“Clâ€“SO₄ System Incorporating New Experimental Heat Capacities in Na₂SO₄, K₂SO₄, and MgSO₄ Solutions. Journal of Chemical & Engineering Data, 2017, 62, 3151-3168.	1.9	13
116	Habitability Models for Astrobiology. Astrobiology, 2021, 21, 1017-1027.	3.0	13
117	Prebiotic Protocell Membranes Retain Encapsulated Contents during Flocculation, and Phospholipids Preserve Encapsulation during Dehydration. Langmuir, 2022, 38, 1304-1310.	3.5	12
118	Modeling calcium sulfate chemistries with applications to Mars. Icarus, 2016, 278, 31-37.	2.5	11
119	The Longevity of Water Ice on Ganymedes and Europas around Migrated Giant Planets. Astrophysical Journal, 2017, 839, 32.	4.5	11
120	Eolianite Grain Size Distributions as a Proxy for Large Changes in Planetary Atmospheric Density. Journal of Geophysical Research E: Planets, 2018, 123, 2506-2526.	3.6	11
121	Modeling nitrogen-gas, -liquid, -solid chemistries at low temperatures (173â€“298K) with applications to Titan. Icarus, 2014, 236, 1-8.	2.5	10
122	The Early Mars Climate System. , 2017, , 526-568.		9
123	The Peak Absorbance Wavelength of Photosynthetic Pigments Around Other Stars From Spectral Optimization. Frontiers in Astronomy and Space Sciences, 2021, 8, .	2.8	9
124	Constraints on hydrogen levels in the Archean atmosphere based on detrital magnetite. Geochimica Et Cosmochimica Acta, 2019, 262, 207-219.	3.9	8
125	Atmospheric Evolution, Mars. Encyclopedia of Earth Sciences Series, 2009, , 66-75.	0.1	8
126	Mars Atmosphere: History and Surface Interactions. , 2007, , 301-314.		7

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127	Quantitative discrimination between geological materials with variable density contrast by high resolution X-ray computed tomography: An example using amygdule size-distribution in ancient lava flows. Computers and Geosciences, 2013, 54, 231-238.	4.2	6
128	The response of Phanerozoic surface temperature to variations in atmospheric oxygen concentration. Journal of Geophysical Research D: Atmospheres, 2016, 121, 10,089-10,096.	3.3	6
129	The Exo-Life Finder (ELF) telescope: New strategies for direct detection of exoplanet biosignatures and technosignatures. , 2018, , .		5
130	Twin studies on Mars. Nature, 2005, 436, 42-43.	27.8	4
131	Oxygen and life in the Precambrian. Geobiology, 2006, 4, 225-226.	2.4	4
132	Mars Atmosphere. , 2014, , 343-357.		4
133	Waiting for O₂. , 2014, , .		4
134	Fast and precise boron isotopic analysis of carbonates and seawater using Nu Plasma II multiâ€collector inductively coupled plasma mass spectrometry and a simple sample introduction system. Rapid Communications in Mass Spectrometry, 2019, 33, 1169-1178.	1.5	4
135	Oxygenation of the Earthâ€™s Atmosphere. , 2015, , 1816-1826.		4
136	Geochemistry of Carbonates on Mars: Implications for Climate History and Nature of Aqueous Environments. Space Sciences Series of ISSI, 2012, , 301-328.	0.0	2
137	15 Coupled Evolution of Earthâ€™s Atmosphere and Biosphere. , 0, , 191-206.		1
138	Moon-Mars: The elephant in the attic. Eos, 2005, 86, 143.	0.1	1
139	Oxygenation of the Earthâ€™s Atmosphere. , 2011, , 1200-1208.		1
140	BOULDER-SIZE DISTRIBUTIONS AS INDICATORS FOR DEPOSITION PROCESSES ON EARTH AND MARS. , 2017, , .		1
141	GENESIS: THE SCIENTIFIC QUEST FOR LIFE'S ORIGINS: by Robert M. Hazen. Joseph Henry Press, Washington, D.C., 2005. 339 pages, $27.95. American Mineralogist, 2007, 92, 1543-1543.	1.9	0
142	Conway B. Leovy (1933â€"2011). Eos, 2011, 92, 363-364.	0.1	0
143	The Search for Another Earth-Like Planet and Life Elsewhere. , 0, , 30-56.		0
144	Vesicle paleobarometry in the Pongola Supergroup: A cautionary note and guidelines for future studies. South African Journal of Geology, 2020, 123, 95-104.	1.2	0

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145	Flocculation of Fatty Acid Membranes does not Disrupt Encapsulation: Implications for the Origin of Cells in Evaporative Lake Environments. Biophysical Journal, 2021, 120, 38a.	0.5	0
146	Geochemical Consequences of Widespread Clay Mineral Formation in Marsâ€™ Ancient Crust. Space Sciences Series of ISSI, 2012, , 329-364.	0.0	0