

Skeptic Arguments and What The Science Says

	Skeptic Argument	vs	What the Science Says
1	"Climate's changed before"		Climate reacts to whatever forces it to change at the time; humans are now the dominant forcing.
2	"It's the sun"		In the last 35 years of global warming, sun and climate have been going in opposite directions
3	"It's not bad"		Negative impacts of global warming on agriculture, health & environment far outweigh any positives.
4	"There is no consensus"		97% of climate experts agree humans are causing global warming.
5	"It's cooling"		The last decade 2000-2009 was the hottest on record.
6	"Models are unreliable"		Models successfully reproduce temperatures since 1900 globally, by land, in the air and the ocean.
7	"Temp record is unreliable"		The warming trend is the same in rural and urban areas, measured by thermometers and satellites.
8	"Animals and plants can adapt"		Global warming will cause mass extinctions of species that cannot adapt on short time scales.
9	"It hasn't warmed since 1998"		Every part of the Earth's climate system has continued warming since 1998, with 2015 shattering temperature records.
10	"Antarctica is gaining ice"		Satellites measure Antarctica losing land ice at an accelerating rate.
11	"Ice age predicted in the 70s"		The vast majority of climate papers in the 1970s predicted warming.

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| 12 | "CO2 lags temperature" | CO2 didn't initiate warming from past ice ages but it did amplify the warming. |
| 13 | "Climate sensitivity is low" | Net positive feedback is confirmed by many different lines of evidence. |
| 14 | "We're heading into an ice age" | Worry about global warming impacts in the next 100 years, not an ice age in over 10,000 years. |
| 15 | "Ocean acidification isn't serious" | Ocean acidification threatens entire marine food chains. |
| 16 | "Hockey stick is broken" | Recent studies agree that recent global temperatures are unprecedented in the last 1000 years. |
| 17 | "Climategate CRU emails suggest conspiracy" | A number of investigations have cleared scientists of any wrongdoing in the media-hyped email incident. |
| 18 | "Hurricanes aren't linked to global warming" | There is increasing evidence that hurricanes are getting stronger due to global warming. |
| 19 | "Al Gore got it wrong" | Al Gore's book is quite accurate, and far more accurate than contrarian books. |
| 20 | "Glaciers are growing" | Most glaciers are retreating, posing a serious problem for millions who rely on glaciers for water. |
| 21 | "It's cosmic rays" | Cosmic rays show no trend over the last 30 years & have had little impact on recent global warming. |
| 22 | "1934 - hottest year on record" | 1934 was one of the hottest years in the US, not globally. |
| 23 | "It's freaking cold!" | A local cold day has nothing to do with the long-term trend of increasing global temperatures. |
| 24 | "Extreme weather isn't caused by global warming" | Extreme weather events are being made more |

- frequent and worse by global warming.
- 25 "Sea level rise is exaggerated" A variety of different measurements find steadily rising sea levels over the past century.
 - 26 "It's Urban Heat Island effect" Urban and rural regions show the same warming trend.
 - 27 "Medieval Warm Period was warmer" Globally averaged temperature now is higher than global temperature in medieval times.
 - 28 "Mars is warming" Mars is not warming globally.
 - 29 "Arctic icemelt is a natural cycle" Thick Arctic sea ice is undergoing a rapid retreat.
 - 30 "Increasing CO2 has little to no effect" The strong CO2 effect has been observed by many different measurements.
 - 31 "Oceans are cooling" The most recent ocean measurements show consistent warming.
 - 32 "Climate scientists are in it for the money" Climate scientists could make far more money in other careers - most notably, working for the oil industry.
 - 33 "It's a 1500 year cycle" Ancient natural cycles are irrelevant for attributing recent global warming to humans.
 - 34 "Human CO2 is a tiny % of CO2 emissions" The natural cycle adds and removes CO2 to keep a balance; humans add extra CO2 without removing any.
 - 35 "IPCC is alarmist" Numerous papers have documented how IPCC predictions are more likely to underestimate the climate response.
 - 36 "Water vapor is the most powerful greenhouse gas" Rising CO2 increases atmospheric water vapor, which makes global warming much worse.

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| 37 | "Polar bear numbers are increasing" | Polar bears are in danger of extinction as well as many other species. |
| 38 | "CO2 limits will harm the economy" | The benefits of a price on carbon outweigh the costs several times over. |
| 39 | "It's not happening" | There are many lines of evidence indicating global warming is unequivocal. |
| 40 | "Greenland was green" | Other parts of the earth got colder when Greenland got warmer. |
| 41 | "Greenland is gaining ice" | Greenland on the whole is losing ice, as confirmed by satellite measurement. |
| 42 | "CO2 is not a pollutant" | Through its impacts on the climate, CO2 presents a danger to public health and welfare, and thus qualifies as an air pollutant |
| 43 | "CO2 is plant food" | The effects of enhanced CO2 on terrestrial plants are variable and complex and dependent on numerous factors |
| 44 | "There's no empirical evidence" | There are multiple lines of direct observations that humans are causing global warming. |
| 45 | "Other planets are warming" | Mars and Jupiter are not warming, and anyway the sun has recently been cooling slightly. |
| 46 | "Arctic sea ice has recovered" | Thick arctic sea ice is in rapid retreat. |
| 47 | "There's no correlation between CO2 and temperature" | There is long-term correlation between CO2 and global temperature; other effects are short-term. |

- 48 "We're coming out of the Little Ice Age" Scientists have determined that the factors which caused the Little Ice Age cooling are not currently causing global warming.
- 49 "It cooled mid-century" Mid-century cooling involved aerosols and is irrelevant for recent global warming.
- 50 "Global warming stopped in 1998, 1995, 2002, 2007, 2010, ??????" Global temperature is still rising and 2010 was the hottest recorded.
- 51 "CO2 was higher in the past" Climate has changed along with CO2 levels through geological time.
- 52 "It warmed before 1940 when CO2 was low" Early 20th century warming is due to several causes, including rising CO2.
- 53 "Satellites show no warming in the troposphere" The most recent satellite data show that the earth as a whole is warming.
- 54 "It's aerosols" Aerosols have been masking global warming, which would be worse otherwise.
- 55 "2009-2010 winter saw record cold spells" A cold day in Chicago in winter has nothing to do with the trend of global warming.
- 56 "It's a natural cycle" No known natural forcing fits the fingerprints of observed warming except anthropogenic greenhouse gases.
- 57 "It's El Niño" El Niño has no trend and so is not responsible for the trend of global warming.
- 58 "Mt. Kilimanjaro's ice loss is due to land use" Most glaciers are in rapid retreat worldwide, notwithstanding a few complicated cases.
- 59 "It's not us" Multiple sets of independent observations find a human fingerprint on climate change.
- 60 "There's no tropospheric hot spot" We see a clear "short-term hot spot" - there's various evidence for a "long-term hot spot".

61	"It's Pacific Decadal Oscillation"	The PDO shows no trend, and therefore the PDO is not responsible for the trend of global warming.
62	"2nd law of thermodynamics contradicts greenhouse theory"	The 2nd law of thermodynamics is consistent with the greenhouse effect which is directly observed.
63	"Scientists can't even predict weather"	Weather and climate are different; climate predictions do not need weather detail.
64	"IPCC were wrong about Himalayan glaciers"	Glaciers are in rapid retreat worldwide, despite 1 error in 1 paragraph in a 1000 page IPCC report.
65	"Greenhouse effect has been falsified"	The greenhouse effect is standard physics and confirmed by observations.
66	"CO2 limits will hurt the poor"	Those who contribute the least greenhouse gases will be most impacted by climate change.
67	"Clouds provide negative feedback"	Evidence is building that net cloud feedback is likely positive and unlikely to be strongly negative.
68	"The science isn't settled"	That human CO2 is causing global warming is known with high certainty & confirmed by observations.
69	"Sea level rise predictions are exaggerated"	Sea level rise is now increasing faster than predicted due to unexpectedly rapid ice melting.
70	"It's the ocean"	The oceans are warming and moreover are becoming more acidic, threatening the food chain.
71	"IPCC were wrong about Amazon rainforests"	The IPCC statement on Amazon rainforests was correct, and was incorrectly reported in some media.
72	"Corals are resilient to bleaching"	Globally about 1% of coral is dying out each year.
73	"Volcanoes emit more CO2 than humans"	Humans emit 100 times more CO2 than volcanoes.

74	"CO2 effect is saturated"	Direct measurements find that rising CO2 is trapping more heat.
75	"Greenland ice sheet won't collapse"	When Greenland was 3 to 5 degrees C warmer than today, a large portion of the Ice Sheet melted.
76	"CO2 is just a trace gas"	Many substances are dangerous even in trace amounts; what really matters is the total amount of CO2 in the atmosphere.
77	"500 scientists refute the consensus"	Around 97% of climate experts agree that humans are causing global warming.
78	"It's methane"	Methane plays a minor role in global warming but could get much worse if permafrost starts to melt.
79	"CO2 has a short residence time"	Excess CO2 from human emissions has a long residence time of over 100 years
80	"CO2 measurements are suspect"	CO2 levels are measured by hundreds of stations across the globe, all reporting the same trend.
81	"Humidity is falling"	Multiple lines of independent evidence indicate humidity is rising and provides positive feedback.
82	"Neptune is warming"	And the sun is cooling.
83	"Jupiter is warming"	Jupiter is not warming, and anyway the sun is cooling.
84	"Springs aren't advancing"	Hundreds of flowers across the UK are flowering earlier now than any time in 250 years.
85	"It's land use"	Land use plays a minor role in climate change, although carbon sequestration may help to mitigate.
86	"Scientists tried to 'hide the decline' in global temperature"	The 'decline' refers to a decline in northern tree-rings, not global temperature, and is openly discussed in papers and the IPCC reports.

87	"CO2 is not increasing"	CO2 is increasing rapidly, and is reaching levels not seen on the earth for millions of years.
88	"Record snowfall disproves global warming"	Warming leads to increased evaporation and precipitation, which falls as increased snow in winter.
89	"Wildfires are not caused by global warming"	Global warming worsens wildfires by creating drier conditions with more fuel for fires to spread further and faster.
90	"They changed the name from 'global warming' to 'climate change'"	'Global warming' and 'climate change' mean different things and have both been used for decades.
91	"Solar Cycle Length proves its the sun"	The sun has not warmed since 1970 and so cannot be driving global warming.
92	"CO2 is coming from the ocean"	The ocean is absorbing massive amounts of CO2, and is becoming more acidic as a result.
93	"IPCC overestimate temperature rise"	Monckton used the IPCC equation in an inappropriate manner.
94	"Pluto is warming"	And the sun has been recently cooling.
95	"CO2 is not the only driver of climate"	Theory, models and direct measurement confirm CO2 is currently the main driver of climate change.
96	"Peer review process was corrupted"	An Independent Review concluded that CRU's actions were normal and didn't threaten the integrity of peer review.
97	"CO2 limits will make little difference"	If every nation agrees to limit CO2 emissions, we can achieve significant cuts on a global scale.
98	"Arctic was warmer in 1940"	The actual data show high northern latitudes are warmer today than in 1940.
99	"Renewable energy is too expensive"	When you account for all of the costs associated with burning coal and other fossil fuels, like air pollution

- and health effects, in reality they are significantly more expensive than most renewable energy sources.
- 100 "Southern sea ice is increasing" Antarctic sea ice has grown in recent decades despite the Southern Ocean warming at the same time.
- 101 "Sea level rise is decelerating" Global sea level data shows that sea level rise has been increasing since 1880 while future sea level rise predictions are based on physics, not statistics.
- 102 "Humans are too insignificant to affect global climate" Humans are small but powerful, and human CO2 emissions are causing global warming.
- 103 "It's microsite influences" Microsite influences on temperature changes are minimal; good and bad sites show the same trend.
- 104 "Lindzen and Choi find low climate sensitivity" Lindzen and Choi's paper is viewed as unacceptably flawed by other climate scientists.
- 105 "Phil Jones says no global warming since 1995" Phil Jones was misquoted.
- 106 "Infrared Iris will reduce global warming" The iris hypothesis has not withstood the test of time - subsequent research has found that if it exists, the effect is much smaller than originally hypothesized, and may even slightly amplify rather than reducing global warming.
- 107 "Dropped stations introduce warming bias" If the dropped stations had been kept, the temperature would actually be slightly higher.
- 108 "It's too hard" Scientific studies have determined that current technology is sufficient to reduce greenhouse gas emissions enough to avoid dangerous climate change.
- 109 "It's not urgent" A large amount of warming is delayed, and if we don't act now we could pass tipping points.
- 110 "It's albedo" Albedo change in the Arctic, due to receding ice, is increasing global warming.

111	"Tree-rings diverge from temperature after 1960"	This is a detail that is complex, local, and irrelevant to the observed global warming trend.
112	"It's soot"	Soot stays in the atmosphere for days to weeks; carbon dioxide causes warming for centuries.
113	"Roy Spencer finds negative feedback"	Spencer's model is too simple, excluding important factors like ocean dynamics and treats cloud feedbacks as forcings.
114	"Hansen's 1988 prediction was wrong"	Jim Hansen had several possible scenarios; his mid-level scenario B was right.
115	"It's global brightening"	This is a complex aerosol effect with unclear temperature significance.
116	"Earth hasn't warmed as much as expected"	This argument ignores the cooling effect of aerosols and the planet's thermal inertia.
117	"Arctic sea ice loss is matched by Antarctic sea ice gain"	Arctic sea ice loss is three times greater than Antarctic sea ice gain.
118	"It's a climate regime shift"	There is no evidence that climate has chaotic "regimes" on a long-term basis.
119	"Solar cycles cause global warming"	Over recent decades, the sun has been slightly cooling & is irrelevant to recent global warming.
120	"Over 31,000 scientists signed the OISM Petition Project"	The 'OISM petition' was signed by only a few climatologists.
121	"Less than half of published scientists endorse global warming"	Around 97% of climate experts agree that humans are causing global warming.
122	"A drop in volcanic activity caused warming"	Volcanoes have had no warming effect in recent global warming - if anything, a cooling effect.
123	"Plant stomata show higher and more variable CO2 levels"	Stomatal data is not as direct as ice core measurements and hence not as precise.

- 124 "Ice isn't melting" Arctic sea ice has shrunk by an area equal to Western Australia, and summer or multi-year sea ice might be all gone within a decade.
- 125 "Sea level is not rising" The claim sea level isn't rising is based on blatantly doctored graphs contradicted by observations.
- 126 "Climate is chaotic and cannot be predicted" Weather is chaotic but climate is driven by Earth's energy imbalance, which is more predictable.
- 127 "IPCC 'disappeared' the Medieval Warm Period" The IPCC simply updated their temperature history graphs to show the best data available at the time.
- 128 "It's ozone" Ozone has only a small effect.
- 129 "Freedom of Information (FOI) requests were ignored" An independent inquiry found CRU is a small research unit with limited resources and their rigour and honesty are not in doubt.
- 130 "Climate 'Skeptics' are like Galileo" Modern scientists, not anti-science skeptics, follow in Galileo's footsteps.
- 131 "The IPCC consensus is phoney" 113 nations signed onto the 2007 IPCC report, which is simply a summary of the current body of climate science evidence.
- 132 "Tuvalu sea level isn't rising" Tuvalu sea level is rising 3 times larger than the global average.
- 133 "Naomi Oreskes' study on consensus was flawed" Benny Peiser, the Oreskes critic, retracted his criticism.
- 134 "Renewables can't provide baseload power" A number of renewable sources already do provide baseload power, and we don't need renewables to provide a large percentage of baseload power immediately.

135	"Trenberth can't account for the lack of warming"	Trenberth is talking about the details of energy flow, not whether global warming is happening.
136	"Ice Sheet losses are overestimated"	A number of independent measurements find extensive ice loss from Antarctica and Greenland.
137	"CRU tampered with temperature data"	An independent inquiry went back to primary data sources and were able to replicate CRU's results.
138	"Melting ice isn't warming the Arctic"	Melting ice leads to more sunlight being absorbed by water, thus heating the Arctic.
139	"Breathing contributes to CO2 buildup"	By breathing out, we are simply returning to the air the same CO2 that was there to begin with.
140	"Satellite error inflated Great Lakes temperatures"	Temperature errors in the Great Lakes region are not used in any global temperature records.
141	"Soares finds lack of correlation between CO2 and temperature"	Soares looks at short-term trends which are swamped by natural variations while ignoring the long-term correlation.
142	"We're heading into cooling"	There is no scientific basis for claims that the planet will begin to cool in the near future.
143	"Murry Salby finds CO2 rise is natural"	Multiple lines of evidence make it very clear that the rise in atmospheric CO2 is due to human emissions.
144	"The sun is getting hotter"	The sun has just had the deepest solar minimum in 100 years.
145	"Most of the last 10,000 years were warmer"	This argument uses regional temperature data that ends in 1855, long before modern global warming began.
146	"97% consensus on human-caused global warming has been disproven"	The 97% consensus has been independently confirmed by a number of different approaches and lines of evidence.

- 147 "CO2 emissions do not correlate with CO2 concentration" That humans are causing the rise in atmospheric CO2 is confirmed by multiple isotopic analyses.
- 148 "It's waste heat" Greenhouse warming is adding 100 times more heat to the climate than waste heat.
- 149 "Water vapor in the stratosphere stopped global warming" This possibility just means that future global warming could be even worse.
- 150 "It warmed just as fast in 1860-1880 and 1910-1940" The warming trend over 1970 to 2001 is greater than warming from both 1860 to 1880 and 1910 to 1940.
- 151 "An exponential increase in CO2 will result in a linear increase in temperature" CO2 levels are rising so fast that unless we decrease emissions, global warming will accelerate this century.
- 152 "Record high snow cover was set in winter 2008/2009" Winter snow cover in 2008/2009 was average while the long-term trend in spring, summer, and annual snow cover is rapid decline.
- 153 "A grand solar minimum could trigger another ice age" Peer-reviewed research, physics, and math all tell us that a grand solar minimum would have no more than a 0.3°C cooling effect, barely enough to put a dent in human-caused global warming.
- 154 "Climate change solutions are too expensive" Many climate solutions are cheaper than the alternatives before even accounting for the trillions of dollars saved by reducing climate and air pollution.
- 155 "Mauna Loa is a volcano" The global trend is calculated from hundreds of CO2 measuring stations and confirmed by satellites.
- 156 "CERN CLOUD experiment proved cosmic rays are causing global warming" The CERN CLOUD experiment only tested one-third of one out of four requirements necessary to blame global warming on cosmic rays, and two of the other requirements have already failed.
- 157 "Venus doesn't have a runaway greenhouse effect" Venus very likely underwent a runaway or 'moist' greenhouse phase earlier in its history, and today is kept hot by a dense CO₂ atmosphere.

- 158 "It's planetary movements" Blaming global warming on the movements of other planets is little more than 'climastrology' and curve fitting without a physical basis.
- 159 "Deniers are part of the 97%" If anyone claims to be part of the 97 percent, it means they disagree with the contrarian argument that humans are having a minimal impact on global warming.
- 160 "Water levels correlate with sunspots" This detail is irrelevant to the observation of global warming caused by humans.
- 161 "Antarctica is too cold to lose ice" Glaciers are sliding faster into the ocean because ice shelves are thinning due to warming oceans.
- 162 "Positive feedback means runaway warming" Positive feedback won't lead to runaway warming; diminishing returns on feedback cycles limit the amplification.
- 163 "Skeptics were kept out of the IPCC?" Official records, Editors and emails suggest CRU scientists acted in the spirit if not the letter of IPCC rules.
- 164 "CO2 was higher in the late Ordovician" The sun was much cooler during the Ordovician.
- 165 "Warming causes CO2 rise" Recent warming is due to rising CO2.
- 166 "Coral atolls grow as sea levels rise" Thousands of coral atolls have "drowned" when unable to grow fast enough to survive at sea level.
- 167 "It's internal variability" Internal variability can only account for small amounts of warming and cooling over periods of decades, and scientific studies have consistently shown that it cannot account for the global warming over the past century.

- 168 "CO2 increase is natural, not human-caused" Many lines of evidence, including simple accounting, demonstrate beyond a shadow of a doubt that the increase in atmospheric CO2 is due to human fossil fuel burning.
- 169 "No warming in 16 years" Global surface temperatures have continued to rise steadily beneath short-term natural cooling effects, and the rise in global heat content has not slowed at all.
- 170 "It's CFCs" CFCs contribute at a small level.
- 171 "Scientists retracted claim that sea levels are rising" The Siddall 2009 paper was retracted because its predicted sea level rise was too low.
- 172 "Renewable energy investment kills jobs" Investment in renewable energy creates more jobs than investment in fossil fuel energy.
- 173 "CO2 limits won't cool the planet" CO2 limits won't cool the planet, but they can make the difference between continued accelerating global warming to catastrophic levels vs. slowing and eventually stopping the warming at hopefully safe levels.
- 174 "Schmittner finds low climate sensitivity" The Schmittner et al. study finds low probability of both very low and very high climate sensitivities, and its lower estimate (as compared to the IPCC) is based on a new temperature reconstruction of the Last Glacial Maximum that may or may not withstand the test of time.
- 175 "Greenland has only lost a tiny fraction of its ice mass" Greenland's ice loss is accelerating & will add metres of sea level rise in upcoming centuries.
- 176 "DMI show cooling Arctic" While summer maximums have showed little trend, the annual average Arctic temperature has risen sharply in recent decades.
- 177 "Ben Santer rewrote the 1995 IPCC report" The IPCC operates by consensus. Ben Santer could not have and did not single-handedly alter the 1995 IPCC report. Accusations to the contrary are simply

		an attempt to re-write history.
178	"It's a climate shift step function caused by natural cycles"	Natural cycles superimposed on a linear warming trend can be mistaken for step changes, but the underlying warming is caused by the external radiative forcing.
179	"Royal Society embraces skepticism"	The Royal Society still strongly state that human activity is the dominant cause of global warming.
180	"It's only a few degrees"	A few degrees of global warming has a huge impact on ice sheets, sea levels and other aspects of climate.
181	"It's satellite microwave transmissions"	Satellite transmissions are extremely small and irrelevant.
182	"CO2 only causes 35% of global warming"	CO2 and corresponding water vapor feedback are the biggest cause of global warming.
183	"IPCC graph showing accelerating trends is misleading"	All of the statements made in the IPCC report regarding the figure in question are correct and supported.
184	"Sea level fell in 2010"	The temporary drop in sea level in 2010 was due to intense land flooding caused by a strong La Nina.
185	"Arctic sea ice extent was lower in the past"	Current Arctic sea ice extent is the lowest in the past several thousand years.
186	"Climate change isn't increasing extreme weather damage costs"	The data and research are unclear whether climate change is increasing extreme weather damage costs, but many types of extreme weather are becoming more intense and/or frequent, and disaster costs from extreme weather events are rising.
187	"UAH atmospheric temperatures prove climate models and/or surface temperature data sets are wrong"	The most likely explanation for UAH data warming less than expected is that the UAH data set is biased low.
188	"IPCC human-caused global warming attribution confidence is unfounded"	The IPCC 95% confidence that humans are responsible for most of the current global warming is simply a summary of the peer-reviewed scientific

[research.](#)

- 189 "We didn't have global warming during the Industrial Revolution" CO2 emissions were much smaller 100 years ago.
- 190 "Ljungqvist broke the hockey stick" Ljungqvist's temperature reconstruction is very similar to other reconstructions by Moberg and Mann.
- 191 "Hansen predicted the West Side Highway would be underwater" Hansen was speculating on changes that might happen if CO2 doubled.
- 192 "Removing all CO2 would make little difference" Removing CO2 would cause most water in the air to rain out and cancel most of the greenhouse effect.
- 193 "Great Barrier Reef is in good shape" Evidence clearly shows that both ocean warming and acidification due to human CO2 emissions are damaging the Great Barrier Reef
- 194 "Loehle and Scafetta find a 60 year cycle causing global warming" Loehle and Scafetta's paper is nothing more than a curve fitting exercise with no physical basis using an overly simplistic model.
- 195 "Postma disproved the greenhouse effect" Postma's model contains many simple errors; in no way does Postma undermine the existence or necessity of the greenhouse effect.
- 196 "Underground temperatures control climate" The amount of heat energy coming out of the Earth is too small to even be worth considering.
- 197 "Humans survived past climate changes" Humans have been through climate changes before- but mostly cold ones and mostly in our far distant past.
- 198 "Heatwaves have happened before" Global warming is increasing the frequency, duration and intensity of heatwaves.



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