

**Expert Reviewer: GRAY**

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1	SPM	0				This Chapter should be deleted. It is repetitive of what is said in the "Technical Summary" which is written by some of the same people, and it is a misnomer, since it is agreed line-by-line by Government Representatives, and so is a "Summary BY Policymakers". It is demeaning to subject grown professionally qualified scientists to this form of coercion by politicians. It tells the world that IPCC Reports are politically controlled documents, not the honest opinions of the scientists. It also holds up publication by being approved after the final draft has been agreed, leading to the problem either of an obvious disagreement or an attempt to amend the Final Draft.
2	SPM	3	4	3	4	Footnote Number 1. I have argued in the "General" section that the term "climate change" should be abandoned as it is proposed that it should have two different meanings leading to unfortunate confusion with the public and even many scientists. I suggest that the entire Report be titled "Climate Science". The footnote should deal with the subject matter to be dealt with. The one suggested is unsatisfactory. What is meant by "over time" Does this mean, over ANY period, even millions of years, or would you restrict it?. Then why is "natural" change regarded as only possessing "variability" rather than "change"? "Human activities obviously include changes caused by humans in atmospheric greenhouse gas concentrations, but it should be made plain that it also includes "human activities" that modify the climate which are unrelated to greenhouse gases, such as urban development, energy emissions, land and water use changes, and agriculture and forestry. Instead of a footnote the scope of the study should be up front at the beginning of the Report, A suggested wording is "This Report summarises and assesses scientific evidence and results of all changes of the climate, including those which are essentially natural and those which are influenced by humans. It attempts to assess in particular the possible consequences to the climate of changes in atmospheric concentration of so-called greenhouse gases, whether these have human or natural origin
3	SPM	3	8	3	8	Replace "cause climate change" with "influence changes in the climate"
4	SPM	3	25	3	25	Add at end "probably"
5	SPM	3	26	3	26	Add after "years. "although the concentration of methane has currently stabilised"
6	SPM	3	28	3	28	Add at end "But this does not mean that it might still be due to natural influences"
7	SPM	3	30	3	30	Add at beginning "Most of the".
8	SPM	3	36	3	36	Four years is an insufficient time to judge trends. I suggest that you replace this with the trend of the past 30 years, which is an average of 1.51ppm/yr.. There is no significant evidence of a recent increase for this figure. It represents a linear increase of 0.41% a year
9	SPM	3	36	3	37	Replace from "increased" on line 36 to "global" on line 37by" linearly by 1.51ppm/yr from 1975 to 2004; 0.41% a year"
10	SPM	3	36	3	36	Insert "Average" at the beginning
11	SPM	3	36	3	36	After "concentrations" insert "measured over the oceans"

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12	SPM	3	37	3	37	Replace "6.5" by "4.6"
13	SPM	3	38	3	38	Insert after "Gt/yr" , "over the period"
14	SPM	3	39	3	39	After "contributed" insert "about"
15	SPM	3	42	3	42	insert "to zero and may become negative" after "declined"
16	SPM	3	42	3	43	I don't understand how you get a "sum" of "Sources", so delete from "The" in line 42 to "bu"t in line 43.Capital C for "changes"
17	SPM	4		4		The right hand caption on the three upper graphs should be W/m squared
18	SPM	4		4		I had always thought that radiative forcing was a function of the logarithm of concentration, These graphs do not appear to bring this out.
19	SPM	5	1	5	1	Insert after ."human activities" "such as emissions of greenhouse gases, land-use and urban changes and energy emissions"
20	SPM	5	4	5	4	Insert before "well", "fairly"
21	SPM	5	4	5	4	Add at end "Changes in the main greenhouse gas, water vapour, and in clouds, are, however, virtually unknown"
22	SPM	5	7	5	7	Insert before "increases"" If water vapour and clouds are ignored completely"
23	SPM	5	13	0	13	It is universal statistical practice to indicate unvertainty by at least two standard deviations. All the error bars on the Figure should therefore be doubled
24	SPM	5	5	5	8	I hope that all these confidence figures are for TWO standard deviations. If they are only ONE they must all be doubled.
25	SPM	5				The caption to the diagram should be W/metre squared.
26	SPM	5	21	5	21	The confidence limits should be two standard deviations
27	SPM	5	27	5	27	The confidence limits should be two standard deviations
28	SPM	6	2	6	2	The confidence limits should be two standard deviations
29	SPM	6	6	6	6	"Factor of 2 uncertainty" does this mean one standard deviation? If so it should be doubled
30	SPM	6	9	6	10	This statement is surely obvious. Hardly a great new discovery?
31	SPM	6	13	6	13	Insert after "forcing" "Water vapor changes might also be taking place from natural causes or from human activities unrelated to greenhouse gas emissions"
32	SPM	6	14	6	14	Replace "importance of the expected" by "likely presence of"

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33	SPM	5	13	5	13	There are major forcing agents excluded from this diagram. They are water vapour and clouds.. It is absurd to regard these as "feedbacks" to carbon dioxide. They have forcing effects in their own right and these may or may not be depend on global temperature, since they include natural changes, both from geological and biological factors and those brought about by human activities which are unrelated to greenhouse gas emissions, such as agricultural practices, water management, land-use changes and urbanisation.. The only reason you omit them from this diagram is that their effects are so little known that the uncertainties would swamp every other forcing agent and render the whole exercise superfluous.
34	SPM	6	13	6	14	"New" information on "water vapour feedback" could not possible indicate how ALL sources of water vapour have changed over the past century
35	SPM	6	34	6	34	Add after."record", "from the upwardly biased surface temperature record" ( for evidence of this see McKitrick and Michaels 2004 "A test of corrections for extraneous signals in gridded surface temperature data " "Climate Research" Vol 26 pages 159-173.
36	SPM	6	35	6	35	Add after ."(2001-2005)", "because the biases from socioeconomic factors have been the greatest"
37	SPM	6	38	6	38	Insert after "temperature", "anomaly, as estimated from weather stations and ship measurements"
38	SPM	6	38	6	40	.Delete from the amended first sentence on line 38 to "warm years" on line 40
39	SPM	6	40	6	40	"Most of the warming" is untrue. ALL of the warming took place from 1910 to 1942 and from 1979 to 2005
40	SPM	6	40	6	42	Delete from "variability" on line 40 to end on line 42. Insert "there was a small cooling period from 1850 to 1910 followed by a warming period from 1910 to 1942, of 0.4°C ( 0.125°C per decade) which was probably due to urban development around the early weather stations, although IPCC 1990 ("Climate Change") attributed it to a "recovery from the ice age" There was then a cooling period from 1942 to 1979 of about 0.05°C which was likely caused by a move of weather stations to airports, The second warming period, from 1979 to 2005 of 0.42°C (0.16°C per decade) was partly caused by the unusually strong El Niño ocean event of 1998, but otherwise mainly by urban influences and land-use changes. A possible influence from increases in greenhouse gases is difficult to justify without an evident influence over the previous periods."
41	SPM	6	41	6	42	The statement "Urban heat island effects are real but local, and do not influence these large scale values" is, to start with, illogical. Temperature variability is also "real but local" but this does not prevent you from calculating an average. Then, the statement is untrue. McKitrick and Michaels 2004 "Climate Research" Vol 26 pages 1159-173 have shown that urban effects DO influence these "large scale values", whereas it is impossible, at present, to show how increases in greenhouse gases, which occurred in a regular fashion over the period, could possibly explain the irregular character of the surface temperature record. It could not have been a factor in the early warming, and it is difficult to use it explain why there should be a cooling between 1942 and 1979 when emissions of greenhouse gases increased steadily.
42	SPM	6	44	6	46	This whole paragraph is untrue. The satellite and weather balloon records are significantly different from the surface record, and you have concealed this by plotting them all together.

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43	SPM	6	44	6	46	Replace whole paragraph by the following. "The satellite and weather balloon records of lower-tropospheric temperature showed significant differences from the surface record. The satellite record showed no overall warming between 1979 and 1997. Then there was a large peak for 1998 associated with the strong El Niño event of that year. From 2002 to 2005 higher temperatures were observed, at present unexplained, but four years is insufficient to establish a possible trend. The weather balloon record showed no overall temperature change between 1958 and 2004.. There was a cooler period in this record between 1964 and 1978 which has been attributed to a change in ocean circulation".
44	SPM	6	49	6	49	Add at end "This discrepancy exists also in the satellite measurements in the lower troposphere.
45	SPM	6	51	6	52	I do not believe this statement. Chapter 3 gives no evidence of a plausible "globally averaged" value, and because of the difficulties of measurement over land most acceptable measurements have been over the sea. Obtaining a scientifically based "average" is almost impossible with a quantity which varies so much over time, space and height. Most reliable measurements are very recent, so do not establish a trend, or a confirmation that they can be related to other greenhouse gases.
46	SPM	6	51	6	51	Delete "Globally averaged": replace "is" by "seems to be"
47	SPM	6	52	6	52	Insert "possibly" after "consistent"
48	SPM	7	1	7	2	This paragraph is misleading. Figure 5.2.1 shows that the heat content of the ocean fluctuates in a possibly cyclic manner. A peak value occurred in 1980 and the current value (2005) is no higher than it was then, if inaccuracies are considered. It is impossible to speak of an "average increase" over a period when it fluctuates up and down..
49	SPM	7	1	7	2	Delete the present paragraph and replace it with " The heat content of the ocean varies in a possibly cyclic fashion. Measurements since 1955 show a steady figure until 1968, an increase to a peak in 1980, a fall to 1987, and a rise since then to a value in 2004 which may be slightly higher than 1980.
50	SPM	7	4	7	4	Insert after "level" "from unrepresentative tide-gauge measurements"
51	SPM	7	4	7	4	Are the confidence limits for TWO standard deviations? If they are only ONE they must be doubled.
52	SPM	7	5	7	5	Are the confidence limits for TWO standard deviations? If they are only ONE they must be doubled.. If so, both measurements are within error bands.
53	SPM	7	4	7	4	Add at end "measured by satellite-based altimetry"
54	SPM	7	5	7	5	Insert after "to", "inaccuracy, instrument calibration"
55	SPM	7	7	7	7	Replace "strengthens evidence" by "indicates"
56	SPM	7	8	7	8	Replace "is" by "may be"
57	SPM	7	12	7	12	Are the "uncertainty ranges" in the graphs based on one or two standard deviations. If only one, they should be doubled.
58	SPM	7	14	7	14	Are the confidence limits for TWO standard deviations? If they are only ONE they must be doubled.. If so, both measurements are within error bands

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59	SPM	8	6	8	6	Are the confidence limuts for TWO standard deviatuons? If they are only ONE they must be doubled..
60	SPM	8	7	8	7	Are the confidence limuts for TWO standard deviatuons? If they are only ONE they must be doubled...
61	SPM	8	10	8	10	replace "increased on average". By "generally increased" Table 4.7.1. gives only "ranges", not "averages". .
62	SPM	8	14	8	14	Delete "systematic" There is no evidence that recent changes are due to some sort of "system"
63	SPM	8	25	8	25	Are the confidence limuts for TWO standard deviatuons? If they are only ONE they must be doubled...
64	SPM	8	26	8	26	Are the confidence limuts for TWO standard deviatuons? If they are only ONE they must be doubled...
65	SPM	8	27	8	27	Inset after "Average" , "land-based"
66	SPM	8	34	8	34	"Mass loss from the Greenland ice sheet" This is untrue. Zwally et al 2005 Journal of Glaciology Vol 51, No 175 Vol 51, page 509 to 527 found that between 1992-2002 there was a loss of ice at the margins but a greater increase in the centre, a small net increase which produced an estimated decline of 0.03±0.01mm/yr.
67	SPM	8	34	8	34	Insert "margins of" after "from", Insert "was more than compensated by an increase in the centre which" after "Sheet"
68	SPM	8	35	8	35	Replace "raising" by "lowering". Replace "0.21±0.7" by "0.03±0.01"
69	SPM	8	39	8	41	I can find no evidence for the statement "Droughts have increased" in Paragraph 3.3.4 of Chapter 3.
70	SPM	8	39	8	39	Replace "have increased" with "are"
71	SPM	8	44	8	44	"On average". Average of what, over what period?
72	SPM	8	44	8	44	Delete "On avergae", Replace "has" by "seems to have"
73	SPM	8	49	8	49	Replace "observed" by "reported"
74	SPM	9	1	9	9	This Table is pure speculative guesswork without scientific foundatiom, and with very slight evidence from observations. It serves no useful purpose, and should be deleted.
75	SPM	9	7	9	9	This attempt to quantify shear guesswork has no scientific basis. Delete it
76	SPM	9	24	9	24	linsert after "500 years" , "because they were measured close to human habitation"
77	SPM	9	24	9	24	Add at end "for the same reason; although there is persuasikve evidence for a "medieval warm period" around the 15th century which was even warmer"
78	SPM	10	14	10	14	Replace "greenhouse gas forcing" with "increases in human population, prosperity, energy usage and land-use changes". McKitrick and Michaels 2004 Climate Change Vol 26 pages 159-173 have shown this to be so for the surface temperature record
79	SPM	10	15	10	15	Add at end "from weather stations and ships"
80	SPM	10	17	10	17	This whole paragraph is without foundation. The "observed" temperature increase is most likely due to increases in human habitation and land-use, The increase in ocean temperature is probably cyclic.All these "attribution" studies are without any scientific basis.

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81	SPM	10	27	10	27	"natural variability" is estimated from models which deny the existence of "natural change". Most of the changes discussed in this section could readily be "attributed" to a mixture of changes in the sun, volcanoes, El Niño, cosmic rays and increases in human prosperity.
82	SPM	10	32	10	32	All these graphs are spurious. The figures for the USA ( Figure 3.2.3) and in China (see Zhao, Ding, Luo, Wang, 2005 Acta Meteorologica Sinica Vol 19 pages 389-400) have been subjected to a procedure called "homogeneity adjustment" to remove the bias. When this is done "global warming" all but disappears. You should replace ALL of the graphs in this diagram with "homogeneity adjusted" graphs, and your contentions about a consistent "warming trend" will disappear
83	SPM	10	34	10	34	I question your ability to determine "natural forcings." "Climate Change 1990" "attributed the rise in temperature from 1910 to 1942 to "recovery from the little ice age" which you now try to deny. You refuse to even consider that most of the observed temperature changes are caused by improvements in human habitation, despite all the evidence.
84	SPM	10	32	10	32	At least this graph shows that the models are completely worthless to forecast future trends, since we have no knowledge of future "natural" changes.
85	SPM	11	1	11	6	Replace whole paragraph by "The contrast between land and sea is one of the best proofs of the influence of local heating on the surface record. Higher temperatures are found in the winter and at night, both indications of improved comfort in human dwellings"
86	SPM	11	1	11		Surely models do not postulate greater radiative forcing over land than over the ocean. Radiative forcing is supposed to be "global" not selective ( See Question 1, Figure 1) The explanation from the extra warming from cities is far more plausible
87	SPM	11	9	11	9	Add at end "but this is not necessarily related to emissions of greenhouse gases"
88	SPM	11	11	11	11	Replace "anthropogenic" by "human-induced"
89	SPM	11	11	11	11	Replace "has likely" with "may have"
90	SPM	11	12	11	13	Replace "strengthen the confidence in this conclusion" with "indicate this" "influences", "not necessarily related to greenhouse gas emissions"
91	SPM	11	15	11	15	Insert after
92	SPM	11	17	11	18	Replace "not understood" with "to be expected, since models cannot simulate natural changes or human influences unrelated to greenhouse gas emissions"
93	SPM	11	20	11	20	Delete "Trends in" and capitalise "Surface"
94	SPM	11	20	11	21	Replace "are likely to" by "might"
95	SPM	11	21	11	21	Insert after "anthropogenic forcing" "which might not imply an influence of greenhouse gas emissions"
96	SPM	11	21	11	21	Insert after "Anthropogenic forcing" "which might not imply an influence of greenhouse gas emissions"
97	SPM	11	33	11	33	Replace "greenhouse gas forcing" with "increases in human population, prosperity, energy usage and land-use changes". McKittrick and Michaels 2004 Climate Change Vol 26 pages 159-173 have shown this to be so for the surface temperature record

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98	SPM	11	44	0	44	Insert after "TAR" "but since they cannot simulate natural climate changes, or those caused by humans which do not involve greenhouse gas emissions, the models are of little use in future forecasting"
99	SPM	11	45	11	48	Insert after "doubling", " (requiring over 200 years at the present rate)"
100	SPM	11	51	11	51	Insert after "scenario" "even when some of them are patently ridiculous"
101	SPM	11	52	11	52	Add at end "which are not circulated for approval to climate scientists"
102	SPM	12	3	12	3	Add at end "However, no such projection has ever been shown to agree with a future change"
103	SPM	12	1	12	1	Insert after "confidence" ""based entirely on self-assessment"
104	SPM	12	9	12	9	Add at end "But the higher figures were based on scenarios which assumed impossible trends"
105	SPM	12	10	12	11	Replace from "providing confidence" on line 10 to "projections" on line 11 with "But the observed temperature increase was not uniform. It was minus 0.02°C per decade from 1942 to 1878, followed by 0.20°C per decade from 1978 to 1998 and a fall since then. These sudden changes could not have been caused by a steady increase in greenhouse gases"
106	SPM	12	11	12	11	Insert after "projections" "Provided it can be assumed that the observed change was entirely due to increases in greenhouse gases; a highly unlikely assumption"
107	SPM	12	19	12	19	Add at end "All this assumes that there are no natural changes or human influences not related to greenhouse gases"
108	SPM	12	22	12	22	Add at end "But it is not known to what extent"
109	SPM	12	29	12	29	It should be noted that scenario A2 makes a number of entirely ridiculous assumptions about the future (such as a nine times growth in coal production by 2100, nearly five times CO2 emissions and a two and a half increase in world population. It should be ignored
110	SPM	13	1	13	1	"65% probability" yet again. Double the figures to get the required 95% probability
111	SPM	13	4	13	4	Add at end "Since the scenarios A1F1 and A2 are highly improbable the realistic range is 1.5°C to 4.1°C"
112	SPM	13	10	13	10	Insert before "worse" "even"
113	SPM	13	12	13	12	Replace "similar to those" with "which do not show the wild variability"
114	SPM	13	13	13	13	.Insert after "northern" "and southern"
115	SPM	13	19	13	19	Add at end ".These results are all based on the assumption that greenhouse gases are the only influence on the climate"