INTERGOVERNMENTAL PANEL ON climate change

FIFTY-FIRST SESSION OF THE IPCC
Principality of Monaco, 20 – 23 September 2019

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ACCEPTANCE OF THE ACTIONS TAKEN AT THE SECOND JOINT SESSION OF WORKING GROUPS I AND II

IPCC Special Report on the Ocean and Cryosphere in a Changing Climate

Changes to the Underlying Scientific-Technical Assessment to ensure consistency with the approved Summary for Policymakers

(Submitted by the Co-Chairs of Working Groups I and II)

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WMO UNEP

SECOND JOINT SESSION OF WORKING GROUPS I AND II
IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) Final Draft

	SPM	SPM Component	Chapter	Chapter Page:Line	Tricklebacks
1	SPM	Start-up box	1	6: 6	After ....more than 5 million people (Kummu et al., 2016). please add: "Small Island Developing States are together home to around 65 million people (United Nations 2015)." Reference here is: United Nations (2015), Small Island Developing States in Numbers, Climate Change Edition 2015. http://unohrlls.org/small-island-developing-states-in-numbers-2015/
2	SPM	Start-up box	1	6: 28	After ...derived from the ocean (FAO, 2018). please add: "Communities far from the coast can also be exposed to changes in the ocean through extreme weather events."
3	SPM	Figure SPM.1	1	17:29	Update of Table CB1.1. Uncertainty ranges updated to be consistent with the data presented in approved Figure SPM.1.
4	SPM	Figure SPM.1	1	47	Please update Figure 1.5 figure and caption to the accepted version of Figure SPM.1 and caption.
5	SPM	A7.5	2	3:32	add "socio-economic" between "and" and "development"
6	SPM	A7	2	3:42	replace "with impacts on agriculture (medium confidence)" with "local impacts on water resources and agriculture (medium confidence)"
7	SPM	A7.6	2	4:26	add "(e.g. in the Himalaya, eastern Africa, the tropical Andes)" after "people".
8	SPM	SPM.2	2	4:45	Replace "Central Europe" by "European Alps, Pyrenees"
9	SPM	A7.1	2	5:23	replace "disturbance regimes" by "ecological disturbances"
10	SPM	C2.6	2	5:39	Add "across all scales" after "water"
11	SPM	SPM.2	2	11:44	replace "East Africa" with "eastern Africa"
12	SPM	SPM.2	2	15:15	Replace "and Central Europe" by ", European Alps and Pyrenees"
13	SPM	SPM.2	2	16:25	replace "Eastern Africa" by "eastern Africa"
14	SPM	SPM.2	2	18:16	Replace "Central Europe" by "in the European Alps, Pyrenees
15	SPM	SPM.2	2	21, Table 2.1	In Table 2.1, replace "Central Europe (Alps)" by "European Alps"
16	SPM	SPM.2	2	22, Table 2.1	In Table 2.2, replace "Central Europe (Alps)" by "European Alps"
17	SPM	SPM.2	2	25:55	Add "(including European Alps and Pyrenees)" after "Central Europe"
18	SPM	SPM.2	2	26:3	Replace "central Europe" by "European Alps"
19	SPM	SPM.2	2	26:16	Replace "Central Europe" by "European Alps"
20	SPM	SPM.2	2	26:20	Replace "central Europe" by "European Alps and Pyrenees"
21	SPM	SPM.2	2	45	Figure 2.8 : replace with corresponding design and material of Figure SPM.2
22	SPM	A7.5	2	48:57	replace "disturbance regime" by "ecological disturbance"
23	SPM	SPM.2	2		replace figure with design and content of SPM version of land part; make figure caption consisten with SPM version
24	SPM	A7.5	2	SM2-45	SM2, page 45, Table SM2.8, after row 3 (Pizarro et al. (2013)) add a new row:"Chilean and Argentinean Andes | Floods | GLOF frequency has increased, partially due to glacier shrinkage and lake growth. | Glacier decline | M | pos | Anacona et al. (2015a)"
25	SPM	A7.5	2	SM2-66	SM2-66, lowest row, change “Anacona et al. (2015)” to “Anacona et al. (2015b)”
26	SPM	A7.5	2	SM2-70	SM2-70, Line 29, change “Anacona, P. I., A. Mackintosh and K. Norton, 2015” to “Anacona, P. I., A. Mackintosh and K. Norton, 2015b”
27	SPM	A7.5	2	SM2-70	SM2-70, before Line 29, insert “Anacona, P. I., A. Mackintosh and K Norton, 2015a: “Hazardous processes and events from glacier and permafrost areas: lessons from the Chilean and Argentinean Andes.” Earth Surface Processes and Landforms 40 (1): 2–21. https://doi.org/10.1002/esp.3524.”
28	SPM	A1.4	3	4:11	Change first sentence to "Arctic sea ice extent continues to decline in all months of the year (very high confidence); the strongest reductions in September (very likely -12.8 ± 2.3% per decade; 1979-2018) areunprecedented in at least 1000 years (medium confidence).
29	SPM	A1.4	3	4:13	Change to: "Arctic sea ice has thinned, concurrent with a shift to younger ice: since 1979, the areal proportion of thick ice at least 5 years old has declined by approximately 90% (very high confidence)."
30	SPM	A1.4	3	4:17	Change to: "(low to medium confidence)"

Table CB1.1.

		Near term: 2031-2050		End-of-century: 2081-2100	
	Scenario	Mean	5-95% range	Mean	5-95% range
Global mean surface air temperature (°C)[a]	RCP2.6	0.9	0.5 to 1.4	1.0	0.3 to 1.7
	RCP4.5	1.1	0.7 to 1.5	1.8	1.0 to 2.6
	RCP6.0	1.0	0.5 to 1.4	2.3	1.4 to 3.2
	RCP8.5	1.4	0.9 to 1.8	3.7	2.6 to 4.8
Global mean sea surface temperature (°C)[b] (section 5.2.5)	RCP2.6	0.64	0.33 to 0.96	0.73	0.20 to 1.27
	RCP8.5	0.95	0.60 to 1.29	2.58	1.64 to 3.51
Surface pH (units) (section 5.2.2.3)[b]	RCP2.6	-0.072	-0.072 to -0.072	-0.065	-0.065 to -0.066
	RCP8.5	-0.108	-0.106 to -0.110	-0.315	-0.313 to -0.317
Dissolved oxygen (100-600 m) (% change) (section 5.2.2.4)[b]	RCP2.6	-0.9	-1.5 to -0.3	-0.6	-1.2 to 0.0
	RCP8.5	-1.4	-1.8 to -1.0	-3.9	-5.0 to -2.9

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	SPM	SPM Component	Chapter	Chapter Page:Line	Tricklebacks
31	SPM	A1.4	3	12:17	Remove: "It is very likely that" and change to "Sea ice extent (the total area of the Arctic with at least 15% sea ice concentration) has declined since 1979 in each month of the year (very high confidence) (Barber et al., 2017; Comiso et al., 2017b; Stroeve and Notz, 2018) (Figure 3.3)."
32	SPM	A1.4	3	14:47	Change to "very likely" to "very high confidence"
33	SPM	A1.4	3	14:47	Remove: "It is virtually certain" and change to "Arctic sea ice has thinned through volume reductions in satellite altimeter retrievals (Laxon et al., 2013; Kwok, 2018), ocean–sea ice reanalyses (Chevallier et al., 2017) and in situ measurements (Renner et al., 2014; Haas et al., 2017) (very high confidence)."
34	SPM	Fig SPM1	3	60:7	Change to caption of Figure 3.10: "CMIP5 multi-model average (+/- 1 standard deviation)…"
35	SPM	Fig SPM2	3	73:46	Add "(low confidence)" after (Frenot et al., 2005)
36	SPM	Fig SPM2	3	18(TableSM3.9)	Arctic - Rocky Shores row - Impact direction: change from 'No change' to 'Not assessed'
37	SPM	Fig SPM2	3	18(TableSM3.9)	Antarctic - Deep Sea row - Impact direction: change from 'No change' to 'Not assessed'
38	SPM	Fig SPM2	3	21(TableSM3.10)	Antarctic - Transportation & Shipping row: change Impact direction from 'No change' to 'Not assessed' and delete "No observed impacts of climate change on Transportation for the Southern Ocean"
39	SPM	Fig SPM2	3	SM table 9	In cell for sea-ice-associated,Arctic,add 'reduction in areal extent of habitat for ice algae' to the existing text
40	SPM	SPM3.2	4	4-98 line 44-45	Insert (high confidence) at end of first sentence of 4.4.2.5.4
41	SPM	A1.3	5	98:11	line 11 of Section 5.5.1.2.2, p 5-98. replace "10.0 GtC yr–1" with "10.8 GtC yr-1"
42	SPM	A5.3	5	05:37	Add … ocean acidification "in the California Current" and…
43	SPM	A5.3	5	76:3	Add "Bednaršek et al. 2014
44	SPM	A5.3	5	131:1	Add reference "Bednaršek, N., R. A. Feely, J. C. P. Reum, B. Peterson, J. Menkel, S. R. Alin, and B. Hales. "Limacina helicina shell dissolution as an indicator of declining habitat suitability owing to ocean acidification in the California Current Ecosystem." Proceedings of the Royal Society B: Biological Sciences 281, no. 1785 (2014): 20140123."
45	SPM	A5.3	5	5:38	Change to… "and deoxygenation in the California Current and Humboldt Current EBUS are observed in the last few decades (high confidence)"
46	SPM	B2.3	5	29:31	Change to "…5.8a). Models project global surface-ocean declines between 2006-2015 and 2081-2100 of 0.287-0.291 and 0.036-0.042 pH units (both across 99% confidence intervals) for the RCP8.5 and RCP2.6 scenarios,"
47	SPM	B2.3	5	7:30	Replace "The rate and extent of these effects for all variables remain detectable over 30% of the ocean surface in the RCP2.6 scenario, but are much lower than for RCP8.5." with "The projected time of emergence for five primary drivers of marine ecosystem change (surface warming and acidification, oxygen loss, nitrate content and net primary production change) are all prior to 2100 for over 60% of the ocean area under RCP8.5 and over 30% under RCP2.6 (very likely)"
48	SPM	B5.1	5	73:56	Change to "under RCP 2.6 of 3.9–8.5% by 2041-2060 and 3.4–6.4% by 2081-2100 relative to 1986-2005 (based on model projections described in Barange et al. 2019). Under RCP 8.5, the projected decrease was larger: 8.6–14.2% and 20.5–24.1% by the mid- and end- of the 21st century (Figure…"
49	SPM	B5.1	5	7:41	"…projected to decrease by…" should be followed by "3.4% to 6.4% (RCP2.6) and 20.5% to 24.1% (RCP8.5)"
50	SPM	B5.2	5	7:22	Add "(medium confidence)" after "by 2100".
51	SPM	B5.2	5	43:3	Add "(very likely)" before "Figure 5.13)
52	SPM	B5.2	5	55:53	Add "(medium confidence)" after "POC flux".
53	SPM	SPM.2	5	SM597:7	Table SM5.10c Row 8 Tropical Pacific column 3 replace "NA" with "Negative"
54	SPM	SPM.2	5	SM597:7	Table SM5.10c Row 8 Tropical Pacific column 4 replace "NA" with "Tourism condition degraded, Coral reef degraded, increase extreme weather"
55	SPM	SPM.2	5	SM597:7	Table SM5.10c Row 8 Tropical Pacific column 5 replace "NA" with "Medium"
56	SPM	SPM.2	5	SM597:7	Table SM5.10c Row 8 Tropical Pacific column 6 replace "NA" with "Low"
57	SPM	SPM.2	5	SM597:7	Table SM5.10c Row 8 Tropical Pacific column 7 replace "{5.4.2.3.2, 6.3.1}"
58	SPM	SPM.2	5	SM598:0	Table SM5.10c Row 11 Tropical Atlantic column 3 replace "NA" with "Negative"
59	SPM	SPM.2	5	SM598:0	Table SM5.10c Row 11 Tropical Atlantic column 4 replace "NA" with "Tourism condition degraded, increase in extreme weather, Coral reef degraded"
60	SPM	SPM.2	5	SM598:0	Table SM5.10c Row 11 Tropical Atlantic column 5 replace "NA" with "Medium"
61	SPM	SPM.2	5	SM598:0	Table SM5.10c Row 11 Tropical Atlantic column 6 replace "NA" with "Low"
62	SPM	SPM.2	5	SM598:0	Table SM5.10c Row 11 Tropical Atlantic column 7 replace "{5.4.2.3.2, CCB9, 6.3.1}"
63	SPM	SPM.3	5	1:24	add: "Momme Butenschön (Germany)"
64	SPM	SPM.3	5	1:15	Add "Jorn Bruggeman (Netherland)"
65	SPM	SPM.3	5	8:16	Add "sea surface" between "global" and "warming"
66	SPM	SPM.3	5	11:	Add TableSM5.6b (open ocean ecosytsems)
67	SPM	SPM.3	5	19:	Add TableSM5.8b (coastal ecosystems)
68	SPM	SPM.3	5	56:37	After "Sea surface temperare" replace the text by "scales with Global Mean Surface Temperature (GMST) by a factor of 1.44 according to changes in an ensemble of RCP8.5 simulations; with an uncertainty of about 4 % in this scaling factor based on differences between the RCP2.6 and RCP8.5 scenarios." Please also remove the reference (Karl et al., 2015). Start a separate sentece starting "The tranition…"
69	SPM	SPM.3	5	68:48	replace "0.8" by "1.0" in the range for kelp forest (0.6-1.0)

	SPM	SPM Component	Chapter	Chapter Page:Line	Tricklebacks
70	SPM	SPM.3	5	69:2	replace "1.3" by "1.2"
71	SPM	SPM.3	5	69:22	remove the second sentence of the paragraph "In particular, …(high confidence)."
72	SPM	SPM.3	5	69:26	replace the range for kelp forest by "(2.2-2.8)".
73	SPM	SPM.3	5	68:33	remove " which differs by 0.2 °C from global atmospheric 34 temperature (Karl et al., 2015). T" and merge the two sentences by adding "and"
74	SPM	SPM.3	5	72:15	Add ""Model projections are provided by Plymouth Marine Laboratory, Euro-Meditterranean Centre for Climate Change and FishMIP."
75	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 2 (Estuaries), add "IT"
76	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 3 (Salf marshes), add "IT"
77	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 4 (Mangrov forests), add "IT"
78	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 5 (Seagrass meadow), add "S"
79	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 6 (Dandy beaches), add " IT"
80	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 7 (Coral reefs), add "S, IT"
81	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 8 (Rocky reefs), add "S, IT"
82	SPM	SPM.3	5	111:	Second column of the table SM5.8, row 9 (Kelp forests), add "S"
83	SPM	SPM.3	5	111:	First column of the Table SM5.8, row 8, change "Rocky reefs" to "Rocky shores"
84	SPM	A1.4	6	3:15-17	Replace last sentence with "Changes in Arctic sea ice have the potential to influence mid-latitude weather (medium confidence), but there is low confidence in the detection of this influence for specific weather types.
85	SPM	A2.3	6	3:33-37	Replace non-bold text with "Globally, marine heat related events have increased; marine heatwaves, defined when the daily sea surface temperature exceeds the local 99th percentile over the period 1982 to 2016, have doubled in frequency and have become longer-lasting, more intense and more extensive (very likely). It is very likely that between 84–90% of marine heatwaves that occurred between 2006 and 2015 are attributable to the anthropogenic temperature increase."
86	SPM	A2.7	6	4:9-12	Replace statement with "Observations, both in situ (2004–2017) and based on sea surface temperature reconstructions, indicate that the Atlantic Meridional Overturning Circulation (AMOC) has weakened relative to 1850–1900 (medium confidence). There is insufficient data to quantify the magnitude of the weakening, or to properly attribute it to anthropogenic forcing due to the limited length of the observational record. Although attribution is currently not possible, CMIP5 model simulations of the period 1850–2015, on average, exhibit a weakening AMOC when driven by anthropogenic forcing." only first sentence in bold
87	SPM	A3.5	6	10, 17	add full stop after (high confidence). Delete 'although' and start new sentence 'Some regions'
88	SPM	A3.5	6	21,26	remove 'of the North Atlantic, North Pacific and Southern oceans, and the Mediterranean Sea'
89	SPM	A3.5	6	22:43	replace 'showed small increases in significant wave height and larger increases (5%) in extreme wave heights (90th percentiles), especially in the Southern Ocean (Young and Ribal, 2019) 'with 'showed small increases in significant wave height (+0.3 cm/year) and larger increases (5%) in extreme wave heights (90th percentiles) wave heights, especially in the Southern (+1 cm/year) and North Atlantic (+0.8 cm/year) Oceans (Young and Ribal, 2019)'
90	SPM	A3.5	6	23,21	after 'tidal range ' and before 'occurs' add 'more commonly'
91	SPM	A3.5	6	23:9-13	replace ' Southern Ocean, tropical eastern Pacific and Baltic Sea and decrease over the North Atlantic and Mediterranean Sea. They found little agreement between studies of projected changes over the Atlantic Ocean, southern Indian and eastern North Pacific Ocean and no regional agreement of projected changes to extreme wave height. It was noted that few studies focussed on wave direction change, which is important for shoreline response (Morim et al., 2018).' with 'Southern Ocean, tropical eastern Pacific (high confidence) and Baltic Sea (medium confidence) and decrease over the North Atlantic and Mediterranean Sea (high confidence). They found little agreement between studies of projected changes over the Atlantic Ocean, southern Indian and eastern North Pacific Ocean and no regional agreement of projected changes to extreme wave height. It was noted that few studies focussed on wave direction and wave period change, which is are important for shoreline response (Morim et al., 2018)'
92	SPM	A3.5	6	24, 14	after 'tropical eastern Pacific' add '(high confidence)'
93	SPM	A3.5	6	24, 14	after 'Baltic sea' add '(medium confidence)'
94	SPM	A3.6	6	3:12-17	Replace statement with "Anthropogenic climate change has increased observed precipitation (medium confidence), winds (low confidence), and extreme sea level events (high confidence) associated with some tropical cyclones, which has increased intensity of multiple extreme events and associated cascading impacts (high confidence). Anthropogenic climate change may have contributed to a poleward migration of maximum tropical cyclone intensity in the western North Pacific in recent decades related to anthropogenically-forced tropical expansion (low confidence). There is emerging evidence for an increase in annual global proportion of Category 4 or 5 tropical cyclones in recent decades (low confidence)."only first sentence in bold
95	SPM	A3.6	6	14	Table 6.2 entry on Hawaiian hurricanes column 4 change after first comma to 'in combination with the moderately favourable El Niño event conditions (Murakami et al., 2015)'
96	SPM	A3.6	6	16	Table 6.2 entry on hurricanes Harvey, Irma and Maria. change column 4 entry to 'Rainfall intensity in Harvey attributed to climate change (Emanuel, 2017; Risser and Wehner, 2017; van Oldenborgh et al., 2017) and winds and Irma and Maria attributed to climate change; see Box 6.1)'

	SPM	SPM Component	Chapter	Chapter Page:Line	Tricklebacks
97	SPM	A3.6	6	20	after 'Kossin et al, 2016' add '; Moon et al., 2015a; Altman et al., 2018; Studholme and Gulev, 2018; Daloz and Camargo, 2018; Staten et al., 2018'. - refs are Staten, P.W., J. Lu , K. M. Grise , S. M. Davis and T. Birner, 2018; Re-examining tropical expansion. Re-examining tropical expansion. Nature Climate Chnge. Vol. 8.September 2018. 768-775; Daloz, A.S. and S. J. Camargo, 2018; Is the poleward migration of tropical cyclone maximum intensity associated with a poleward migration of tropical cyclone genesis? Clim Dyn (2018) 50:705–715 DOI 10.1007/s00382-017-3636-7; Studholme, J. and S. Gulev, 2018; Concurrent changes to Hadley circulation and the meridional distribution of tropical cyclones. J. Climate, Vol 31, 4367-4389. DOI: 10.1175/JCLI-D-17-0852.1. https://doi.org/10.1175/JCLI-D-17-0852.1; Altman, J., O. N. Ukhvatkin , A. M. Omelko , M. Macek , T. Plener , V. Pejcha , T. Cerny , P. Petrik , M. Srutek , J.-S. Song , A. A. Zhmerenetsky , A. S. Vozmishcheva , P. V. Krestov , T. Y. Petrenko , K.Treydte , and J. Dolezal, 2018; Poleward migration of the destructive effects of tropical cyclones during the 20th century. PNAS | November 6, 2018 | vol. 115 | no. 45 | 11543–11548
98	SPM	A3.6	6	17	Table 6.2 on page 6-17 second last entry: Change 2017 to 2016 and change ‚Yellow Sea / Sea of Japan' to Yellow Sea / East China Sea'. Also delete reference to ‚Korea Meteorological Administration (2016).
99	SPM	A3.6	6	28	Figure 6.3a: Change ‚Yellow Sea / Sea of Japan 2016' to ‚Yellow Sea / East China Sea 2016'
100	SPM	A3.6	6	32:52	Change ‚Yellow Sea / Japan Sea 2016' to ‚Yellow Sea / East China Sea 2016'
101	SPM	A3.6	6	32:53-54	Change reference ‚Korean Meteorological Administration 2016' to 'Kim and Han (2017)'
102	SPM	A3.6	6	3:38-39	change statement to 'Extreme wave heights have increased in the Southern and North Atlantic Oceans by approximately +1 cm/year and 0.8 cm/year over the past three decades (medium confidence). Sea ice loss in the Arctic has also increased wave heights over the period 1992-2014 (medium confidence). Extreme wave heights contribute to extreme sea level events, coastal erosion and flooding.
103	SPM	B2.5	6	4:38-45	Replace statement with "Marine heatwaves are projected to further increase in frequency, duration, spatial extent and intensity (maximum temperature) (very high confidence). Climate models project increases in the frequency of marine heatwaves by 2081-2100, relative to 1850–1900, by approximately 50 times under RCP8.5 and 20 times under RCP2.6 (medium confidence). The largest increases in frequency are projected for the Arctic and the tropical oceans (medium confidence). The magnitude intensity of marine heatwaves is projected to increase about 10-fold under RCP8.5 by 2081–2100, relative to 1850–1900 (medium confidence)." only first sentence in bold
104	SPM	B2.6	6	4:47-49	Replace statement with 'Extreme El Niño and La Niña events are projected to likely increase in frequency in the 21st century and to likely intensify existing hazards, with drier or wetter responses in several regions across the globe. Extreme El Niño events are projected to occur about as twice as often under both RCP2.6 and RCP8.5 in the 21st century when compared to the 20th century (medium confidence). Projections indicate that extreme Indian Ocean Dipole events also increase in frequency (low confidence). {6.5; Figures 6.5, 6.6}' only first sentence in bold
105	SPM	B2.7	6	4:55-5:5	Replace statement with 'The AMOC is projected to weaken in the 21st century under all RCPs (very likely), although a collapse is very unlikely (medium confidence). Based on CMIP5 projections, by 2300, an AMOC collapse is as likely as not for high emissions scenarios and very unlikely for lower ones (medium confidence). Any substantial weakening of the AMOC is projected to cause a decrease in marine productivity in the North Atlantic (medium confidence), more storms in Northern Europe (medium confidence), less Sahelian summer rainfall (high confidence) and South Asian summer rainfall (medium confidence), a reduced number of tropical cyclones in the Atlantic (medium confidence), and an increase in regional sea level along the northeast coast of North America (medium confidence). Such changes would be in addition to the global warming signal. {6.7; Figures 6.8–6.10}' only first sentence in bold
106	SPM	B3.5	6	4:31-36	Replace statement with 'Significant wave heights (the average height from trough to crest of the highest one-third of waves) are projected to increase across the Southern Ocean and tropical eastern Pacific (high confidence) and Baltic Sea (medium confidence) and decrease over the North Atlantic and Mediterranean Sea under RCP8.5 (high confidence). {6.3.1}' all bold
107	SPM	B3.6	6	4:24-29	Replace statement with 'The average intensity of tropical cyclones, the proportion of Category 4 and 5 tropical cyclones and the associated average precipitation rates are projected to increase for a 2°C global temperature rise above any baseline period (medium confidence). Rising mean sea levels will contribute to higher extreme sea levels associated with tropical cyclones (very high confidence). Coastal hazards will be exacerbated by an increase in the average intensity, magnitude of storm surge and precipitation rates of tropical cyclones. There are greater increases projected under RCP8.5 than under RCP2.6 from around mid-century to 2100 (medium confidence). There is low confidence in changes in the future frequency of tropical cyclones at the global scale. {6.3.1}' only first sentence in bold