

5 **Table S1: 21 year mean  $U_{10}$  ( $\overline{\langle U_{10} \rangle}$ , m s<sup>-1</sup>) and  $FCO_2$  ( $\overline{FCO_2}$ , Tg C yr<sup>-1</sup>) in the 11 oceanic RECCAP regions calculated using the different global  $k$ -relationships combined with four different wind products. C\* refers to  $FCO_2$  calculated with a quadratic  $k$ -relationship where  $c$  is recalibrated for each wind product to fit a global average  $k$  value of 16 cm h<sup>-1</sup> for the period of the study (1991-2011). Following the RECCAP nomenclature, NP stands for North Pacific, EP: Equatorial Pacific, SP: South Pacific, NA: North Atlantic, EA: Equatorial Atlantic, SA: South Atlantic, SO: Southern Ocean, NI: North Indian Ocean and SI: South Indian Ocean. Results using the  $k$ -parametrization of Wanninkhof (1992), which are excluded from our analysis, are represented in *italic*. The interannual variability is reported as standard deviations between brackets.**

regions numbers	NP 1	EP 2	EP 3	SP 4	NA 5	NA 6	EA 7	SA 8	SO 9	NI 10	SI 11
$\overline{\langle U_{10} \rangle}$ (m s <sup>-1</sup> )											
CCMP	7.6 (0.2)	6.1 (0.3)	6.5 (0.3)	7.4 (0.2)	9.0 (0.3)	7.3 (0.2)	6.5 (0.2)	7.6 (0.2)	9.84 (0.3)	6.1 (0.2)	8.1 (0.2)
ERA	7.4 (0.1)	5.8 (0.2)	6.2 (0.3)	7.1 (0.1)	8.8 (0.2)	7.0 (0.1)	6.2 (0.1)	7.4 (0.1)	10.0 (0.2)	5.9 (0.1)	7.8 (0.1)
NCEP1	7.4 (0.1)	5.6 (0.1)	5.7 (0.2)	7.0 (0.2)	8.7 (0.2)	7.0 (0.1)	6.4 (0.1)	7.4 (0.1)	9.5 (0.2)	5.8 (0.1)	7.8 (0.1)
NCEP2	8.3 (0.1)	6.2 (0.1)	6.8 (0.3)	7.8 (0.2)	10.2 (0.2)	7.8 (0.1)	7.1 (0.1)	8.2 (0.1)	11.1 (0.3)	6.6 (0.1)	8.7 (0.1)
$\overline{FCO_2}$ (Tg C yr <sup>-1</sup> )											
<b>CCMP</b>											
Sweeney et al. (2007)	-500 (106)	36 (32)	447 (74)	-365 (73)	-191 (35)	-211 (37)	109 (34)	-181 (36)	-260 (152)	100 (29)	-442 (37)
Takahashi et al. (2009)	-482 (102)	35 (31)	430 (71)	-351 (71)	-184 (34)	-203 (36)	105 (32)	-174 (35)	-250 (146)	97 (28)	-425 (35)
Wanninkhof (2014)	-465 (99)	34 (30)	415 (69)	-339 (68)	-178 (33)	-196 (35)	102 (31)	-168 (34)	-242 (141)	93 (27)	-411 (34)
Wanninkhof et al. (2009)	-439 (94)	36 (27)	381 (59)	-312 (63)	-172 (32)	-186 (33)	94 (28)	-157 (32)	-222 (135)	93 (25)	-381 (32)
C*	-474 (101)	35 (30)	424 (70)	-346 (70)	-181 (33)	-200 (35)	104 (32)	-171 (34)	-246 (144)	95 (27)	-419 (35)
<i>Wanninkhof (1992)</i>	<i>-574 (122)</i>	<i>42 (37)</i>	<i>513 (85)</i>	<i>-419 (84)</i>	<i>-220 (40)</i>	<i>-242 (43)</i>	<i>125 (38)</i>	<i>-207 (41)</i>	<i>-298 (174)</i>	<i>115 (33)</i>	<i>-507 (42)</i>
<b>ERA</b>											
Sweeney et al. (2007)	-477 (91)	35 (30)	418 (70)	-336 (59)	-184 (28)	-195 (32)	98 (31)	-175 (33)	-275 (156)	101 (28)	-409 (22)
Takahashi et al. (2009)	-459 (87)	33 (29)	402 (67)	-323 (56)	-177 (27)	-188 (31)	95 (30)	-169 (31)	-264 (150)	97 (27)	-394 (22)
Wanninkhof (2014)	-443 (84)	32 (28)	389 (65)	-312 (54)	-171 (26)	-181 (30)	92 (29)	-163 (30)	-255 (145)	94 (26)	-380 (21)
Wanninkhof et al. (2009)	-413 (79)	35 (26)	360 (56)	-286 (50)	-162 (25)	-169 (28)	87 (26)	-151 (29)	-236 (138)	94 (25)	-351 (19)
C*	-479 (91)	35 (30)	420 (70)	-337 (59)	-184 (28)	-196 (32)	99 (32)	-176 (33)	-276 (156)	101 (28)	-410 (22)
<i>Wanninkhof (1992)</i>	<i>-548 (104)</i>	<i>40 (35)</i>	<i>480 (80)</i>	<i>-385 (67)</i>	<i>-211 (32)</i>	<i>-224 (37)</i>	<i>113 (36)</i>	<i>-201 (38)</i>	<i>-315 (179)</i>	<i>116 (32)</i>	<i>-470 (26)</i>

**Table S1: continued**

<b>NCEP1</b>											
Sweeney et al. (2007)	-481 (88)	21 (26)	347 (56)	-334 (60)	-184 (28)	-197 (32)	104 (33)	-173 (33)	-276 (139)	95 (29)	-408 (19)
Takahashi et al. (2009)	-463 (85)	21 (25)	335 (54)	-322 (57)	-177 (27)	-189 (31)	100 (32)	-167 (32)	-265 (134)	91 (28)	-393 (18)
Wanninkhof (2014)	-447 (82)	20 (24)	323 (52)	-311 (55)	-171 (26)	-183 (30)	96 (31)	-161 (31)	-256 (129)	88 (27)	-379 (18)
Wanninkhof et al. (2009)	-418 (77)	27 (23)	316 (47)	-285 (51)	-163 (25)	-171 (28)	91 (28)	-149 (29)	-239 (123)	89 (25)	-349 (16)
C*	-497 (91)	22 (27)	359 (58)	-345 (62)	-190 (29)	-203 (33)	107 (34)	-179 (34)	-285 (144)	98 (30)	-422 (20)
<i>Wanninkhof (1992)</i>	-552 (101)	24 (30)	399 (64)	-384 (68)	-211 (32)	-226 (37)	119 (38)	-199 (38)	-316 (160)	109 (33)	-468 (22)
<b>NCEP2</b>											
Sweeney et al. (2007)	-654 (121)	31 (33)	495 (74)	-445 (78)	-257 (41)	-269 (44)	135 (42)	-234 (44)	-368 (197)	120 (37)	-530 (23)
Takahashi et al. (2009)	-629 (117)	30 (32)	477 (71)	-429 (75)	-248 (39)	-259 (42)	130 (40)	-225 (42)	-354 (190)	115 (36)	-510 (22)
Wanninkhof (2014)	-608 (113)	29 (31)	460 (69)	-414 (73)	-239 (38)	-250 (41)	125 (39)	-217 (41)	-342 (183)	111 (35)	-492 (21)
Wanninkhof et al. (2009)	-604 (112)	32 (28)	419 (61)	-397 (70)	-245 (40)	-253 (41)	113 (34)	-215 (41)	-340 (188)	108 (32)	-474 (20)
C*	-511 (95)	24 (26)	387 (58)	-348 ( 61)	-201 (32)	-211 (34)	105 (33)	-183 (34)	-288 (154)	93 (29)	-414 (18)
<i>Wanninkhof (1992)</i>	-750 (139)	36 (38)	569 ( 85)	-511 ( 90)	-295 (47)	-309 (50)	155 (48)	-268 (50)	-423 (227)	137 (43)	-608 (26)