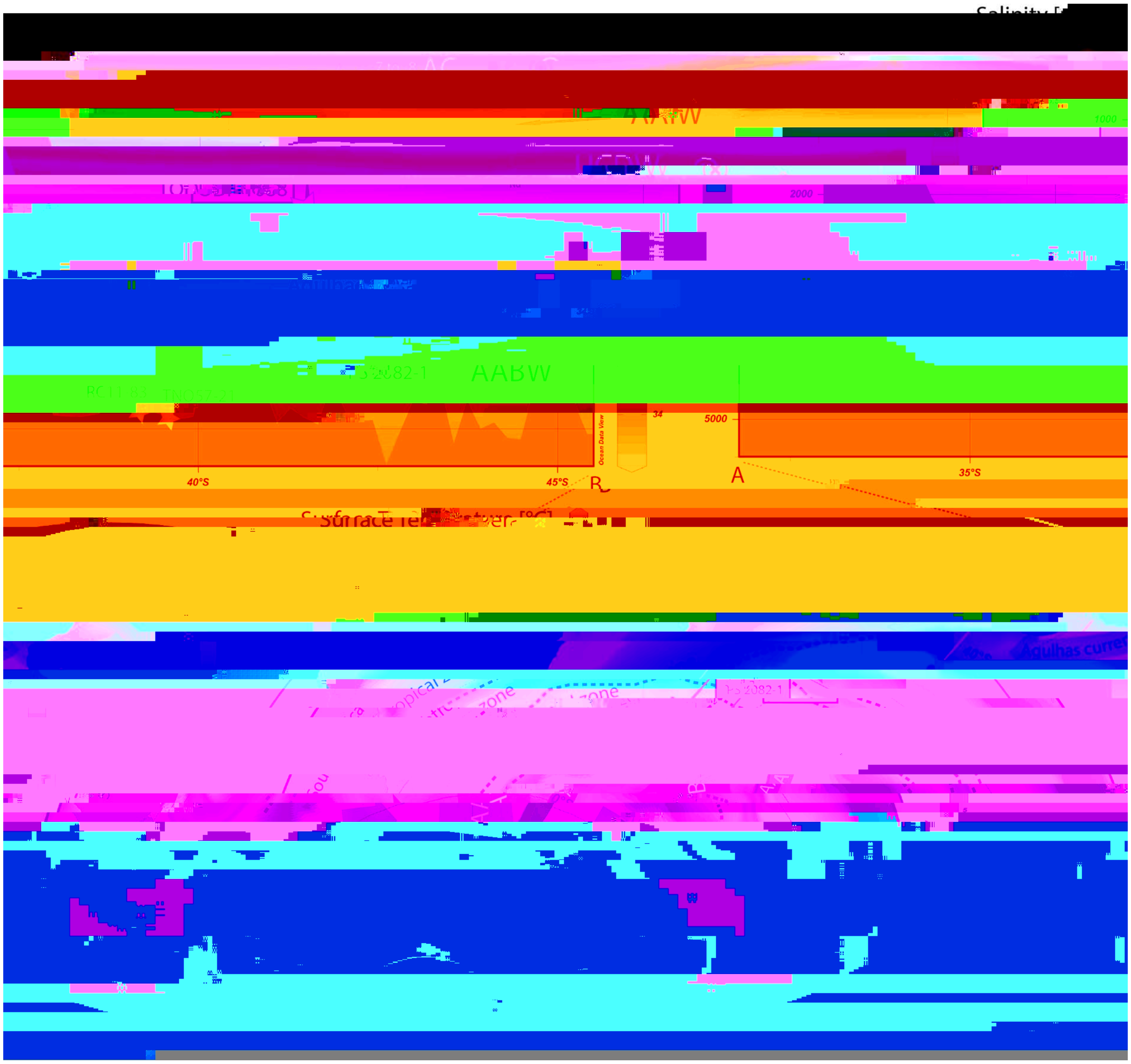
G ac a ed c f AMOC e g a d g- e a ea e g e S e Ocea ce e d-M ce e: de ce f ad ge c Nd a d Hf e



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[illegible] Rutberg et al., 2000 [illegible] Piotrowski et al., 2004, 200 [illegible] Piotrowski, 2005 [illegible] Skinner et al., 2013 [illegible] (1.2 [illegible] 0.7 [illegible]) Pena and Goldstein, 2014 [illegible].

[illegible] Albarède et al., 1 [illegible] Bayon et al., 200 [illegible], 2016 [illegible] Balan et al., 2001 [illegible] Piotrowski et al., 2000 [illegible] van de Flierdt et al., 2002 [illegible]

., Rickli et al., 2010 ,Chen et al., 2013

.1.

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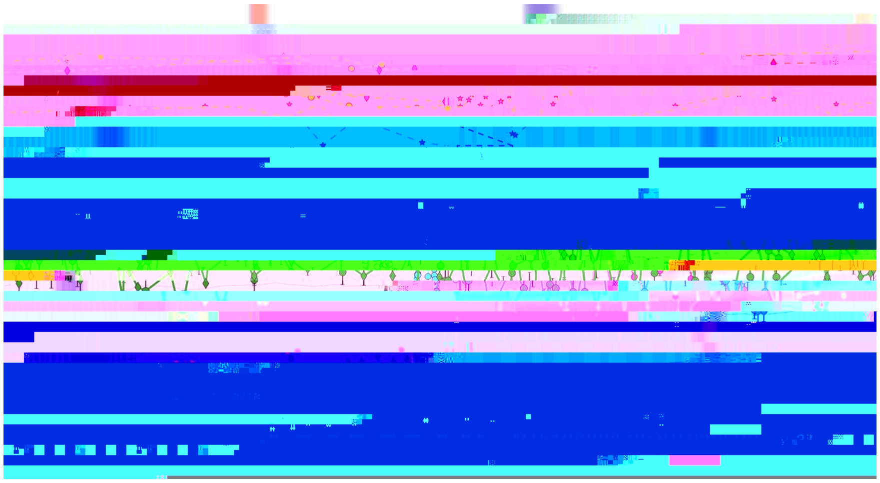
>315 μ



.1.

ε −10 −6.6 0.2 (2σ) 2 3). ε 1 — 1.5. 1. ε (−10) (— 101 Stichel et al. 2012). ε Lisiecki and Raymo, 2005 1 fi ε fl (ε −6.6) 2. ε 11 7.7 7 fi 2).

2σ 11.2 1.1 ε ε fl

ε −13 — 5. 16 −10, ε fl 2).

ε +12.5 +1. (+5.5 +12.5) (3 13) +2 +5 3 ε 11.2 7.3 2.

[illegible] 1.5 [illegible] ε [illegible] (+3.5 0.) [illegible] (+3.5 0. , 2000 [illegible] 104, Stichel et al., 2012 [ ).

[illegible]

[illegible] ε [illegible] ε [illegible] −10.4 [illegible] −0.3, [illegible]

[illegible] Bayon et al., 200 [illegible]. [illegible] O'Nions et al., 1 [illegible], Burton et al., 1 [illegible] Abouchami et al., 1 [illegible] 7, Ling et al., 1 [illegible] 7 [illegible] (>100 [illegible]) [illegible] 3). [illegible] 20%. [illegible] 20% [illegible] 4% [illegible]

δ^{13}

(3) ε

2. ε −6.6 (4) 50%. 2 (25% 50%). (4) (3.6–2.4 Raymo, 1 4). 2. 4 27.54 ( ) Billups et al., 200 (300–400 Billups et al., 200) ε 2. 2–2. 3 (27.3–27.4) (4) ( ). ε 10, Jansen et al., 2000 .

1313 (41 , 32.5 3426) 1

Hu et al., 2016 … 2 ε … 2 ε … (11- 3 … 57-21 … 3), … 3 … ε … fl … (…) … fi … fi … fl … (… 3500) … Hodell et al., 2003 … Adkins, 2013 … Hu et al., 2016 .

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… Hegner et al., 2007 …

[illegible]

[illegible] 5), Diekmann et al., 2003 .

[illegible]

[illegible]

[illegible] 6), [illegible] 5) [illegible] 5). [illegible] 4.3.2.1).

[illegible] .1. [illegible]

[illegible] +5) [illegible] 5) [illegible] Stichel et al., 2012 [illegible] Rickli et al., 2014 [illegible] Toggweiler et al., 2006 [illegible] Stichel et al., 2012 [illegible] Basile et al., 1 [illegible] 7 [illegible] Diekmann et al., 2000 [illegible] Lambert et al., 200 [illegible] 5) [illegible] Diekmann et al., 2003 [illegible]

[illegible] 53 [illegible] 1 6 [illegible] 5) [illegible] 3 [illegible]

[illegible]

[illegible] 2–3 [illegible] 12 [illegible] 10.6 [illegible] 7 [illegible] 2. [illegible] + [illegible] -1. 6 03.2(10 -203.6([illegible])-10. [illegible])-1.3(1.5 42 [illegible]

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