

Interactive comment on “Coral mortality induced by the 2015–2016 El-Niño in Indonesia: the effect of rapid sea level fall” by Eghbert Elvan Ampou et al.

Anonymous Referee #2

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General comments

This is a very interesting observation that describes substantial mortality among reef-flat corals in Indonesia that occurred during the intense El Nino of 2015-16. The authors provide a convincing case that the mortality, confined to a distinct band across the upper portions of the coral colonies, was caused by extended sub-aerial exposure during anomalous low mean sea level some months before the peak sea temperatures. The distinctness of the band and the absence of death among marginally deeper corals is very convincing evidence that exposure to air, not hot water, was the cause of coral death. Of itself, this is not such a profound observation but what makes the paper's cause-effect hypothesis plausible is the inclusion of the sea level data, which shows

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both the vertical extent of the 2015 low sea-level event, its widespread occurrence across Indonesia, and precedents in 2005 and 1998. It surprised me the authors did not make a bit more of the paradox that one of the big 3 global climate change on coral reefs is meant to be a rise in sea-level. It is also likely that the dead patch on P2 is a scar of the previous sub-aerial exposure of this colony in 2005, and I was surprised this was not mentioned.

Specific comments

While I found the overall story plausible and interesting, there is a key flaw and that is the quality of the 6 part colour plate that constitutes the major biological evidence for the story. I don't think that even high quality final prints will show the band of coral death very clearly and I suggest the authors need to include some close-up panels that clearly show the difference between the living and dead surfaces of P1, P2 and P3 and in the *Heliopora coerulea* colony. Table 1 cites the percentage and variability of mortality among corals, but I think it will need, in each cell, the numbers or colonies on which the percentages are based, to satisfy readers with a more quantitative bent. Figure 2 could do with a line drawing of that bit of the N Sulawesi coast to better present the geographic setting for the false colour map of the Bunaken reef. Make the present map of all Indonesia an inset to the N Sulawesi map.

The reference to other literature is quite limited. The regional sea-level story seems like a major oceanographic finding. Has it been described in detail elsewhere, and is it controversial? Also the biological credibility of the author's interpretation would be strengthened by more reference to the literature. For example, Wellington and Glynn (2007) have a plate of a similar pattern of death on large corals at 6 m depth, and BE Brown and co-workers describe similar patterns on the reef-flat at Phuket.

Wellington GM, Glynn PW (2007) Responses of coral reefs to ENSO sea warming events. In Aronson, RB. Geological approaches to coral reef ecology, Springer, 345 – 385

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Brown et al, (2002) Experience shapes the susceptibility of a reef coral to bleaching. *Coral Reefs* 21; 119 – 126.

Please also note the supplement to this comment:
<http://www.biogeosciences-discuss.net/bg-2016-375/bg-2016-375-RC2-supplement.pdf>

Interactive comment on *Biogeosciences Discuss.*, doi:10.5194/bg-2016-375, 2016.