

## ***Interactive comment on “Biofouling protection for marine environmental sensors” by L. Delauney et al.***

**L. Delauney et al.**

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Response to R D Prien comments

Thank you very much for your valuable comments.

Below are propositions to respond to your comments :

=> P2995 line 2 "biofouling mechanisms (growth" Response : We agree with this comment. We will use the following : "mechanisms" in replacement to "mechanism"

=> P2995 line 11 : "on the development of materials that are self-protecting against biofouling." Response : We agree with this comment. We will use the following : "on the development of materials that are self-protecting against biofouling." instead of :

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"on the development of self-biofouling protected materials"

=> P2995 line 13 : "being implemented on commercial" Response : We agree with this comment. We will use the following : "commercial" instead of "commerciall"

=> P2995 line 22 : "them has advantages" Response : We agree with this comment. We will use the following : -> we remove the comma between has and advantages

=> P2995 line 27 : "are adversely affected" Response : We agree with this comment. We will use the following : "adversely" instead of "adversaly"

=> P2997 line 4 : "For example, according to" Response : We agree with this comment. We will use the following : "according to" instead of "from"

=> P2997 line 16 : 3.1 "Reasons for the biofouling protection of housings" Response : We agree with this comment. We will use the following : 3.1 "Reasons for the biofouling protection of housings"

=> P2997 line 18 : "the purpose, why there" Response : We agree with this comment. We will use the following : "why" instead of "whey"

=> P2998 line 11 : "Another reason" Response : We agree with this comment. We will use the following : "another" instead of "an other"

=> P3002 line 1 : "location to another one" Response : We agree with this comment. We will use the following : "another" instead of "an other"

=> p. 3002, line 7 : "decreases due to the screen" Response : We agree with this comment. We will use the following : "decreases" instead of "decrease"

=> p. 3004, line 22 : "spiking. When". Response : We agree with this comment. We will use the following : "spiking" instead of "spikinge"

=> p 3004 : Link to YSI page does not work anymore Response : We agree with this comment. We will use the following :

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<http://www.ysi.com/productsdetail.php?6600EDS-2>

=> p. 3005, lines 14/15 ..."and also allows biocide" Response : We agree with this comment. We will use the following : "also" instead of "alse"

=> p. 3005 : Link to YSI page does not work anymore Response : We agree with this comment. We will use the following : <http://www.ysi.com/accessoriesdetail.php?6-Series-Anti-Fouling-Kits-1>

=> p. 3006, l.14: ..."In this way the whole piping is protected" Response : We agree with this comment. We will use the following : "piping" instead "circuitry"

=> p. 3006, line15: ..."can be found on some autonomous sensors," Response : We agree with this comment. We will use the following : "some" instead of "few"

=> p. 3007, line 4: ..."range of biofouling species." Response : We agree with this comment. We will use the following : "of" instead of "off"

=> p. 3007, line16: schemes Response : We agree with this comment. We will use the following : "schemes" instead of "scheme"

=> p. 3008, line 4: ..."environment, con—" Response : We agree with this comment. We will use the following : we will add a comma between "environment" and "consequently"

=> p. 3008, line 7: "With an open system"... Response : We agree with this comment. We will use the following : we will add the word "an" before "open system"

=> p. 3008, line 11: "al. (2003)."... Response : We agree with this comment. We will use the following : "(2003)" instead of "2003)"

=> p3008 : On the UV irradiation: Could it be that this topic will be revisited as and when UV LEDs C989 become available cheaply in larger quantities? This could make it viable to have UV sources close to the sensor interface at modest power requirements. Response : Yes, this is true. Actually, this is mainly a problem of power requirement and a very limited area is protected by one bulb.

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=> p3009 : I don't know if there is some literature about nano-coating of glass surfaces and it's anti-fouling properties. I have heard from at least one manufacturer of sensors that they are very satisfied using such coated glass interfaces. Response : Yes you are right. We know as well a manufacturer which proposes antifouling coating on optics based on nano-coating, this the TRIOS company. Presently, they could not give us data showing the performance of the nano-coating protection. There are literatures about this subject but none of them are related to sensor protection. Nevertheless we will refer to these papers and we will mention TRIOS manufacturer as an example of future biofouling protection on the go. . .

=> p 3009 : I agree that the ideal protection would be low cost. However, it is worth to assess the savings that an extended deployment interval brings. Depending on the location of the deployment site it could be still economical to spend thousands of dollars (or even tens of thousands) on biofouling protection. Response : You are perfectly right. In some deployment situations, the cost can be high, it won't be a problem. But when you address the problem to a sensor manufacturer, the cost of protection is always relative to the cost of the instrument. Consequently, the "cost" parameter depends on which side you are. This matter is quite interesting and we will add these precisions in the conclusion.

=> p. 3009, line 20: Does the "two years" refer solely to antifouling paints for sensor housings? I think that manufacturers have tried to employ antifouling measures for many years. Response : here is the modification we propose to the comments of G. Griffiths on this matter . "For this last two years, as seen clearly during Oceanology International 2008 in London, nearly every manufacturers of instruments are taking into account this functionality in their design and are well documented and aware on the fouling problem for oceanographic sensor."

=> p. 3010, line 1 : ..."since the free biocide" Response : We agree with this comment. But we propose you the following : "since free biocide production periods can be managed"

=> p. 3011, line 26: ..."stationary FerryBox Helgoland:" Response : We agree with this comment. We will use the following : "FerryBox" instead of "FerryBos"

=> It might be useful to add this book as a separate reference (in addition to the chapter you have in the references already): Marine and Industrial Biofouling, Springer Series on Biofilms , Vol. 4 Flemming, H.-C.; Murthy, P.S.; Venkatesan, R.; Cooksey, K. (Eds.), 2009, XII, 334 p. Response : We agree with this comment.

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Interactive comment on Ocean Sci. Discuss., 6, 2993, 2009.

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