Supporting information

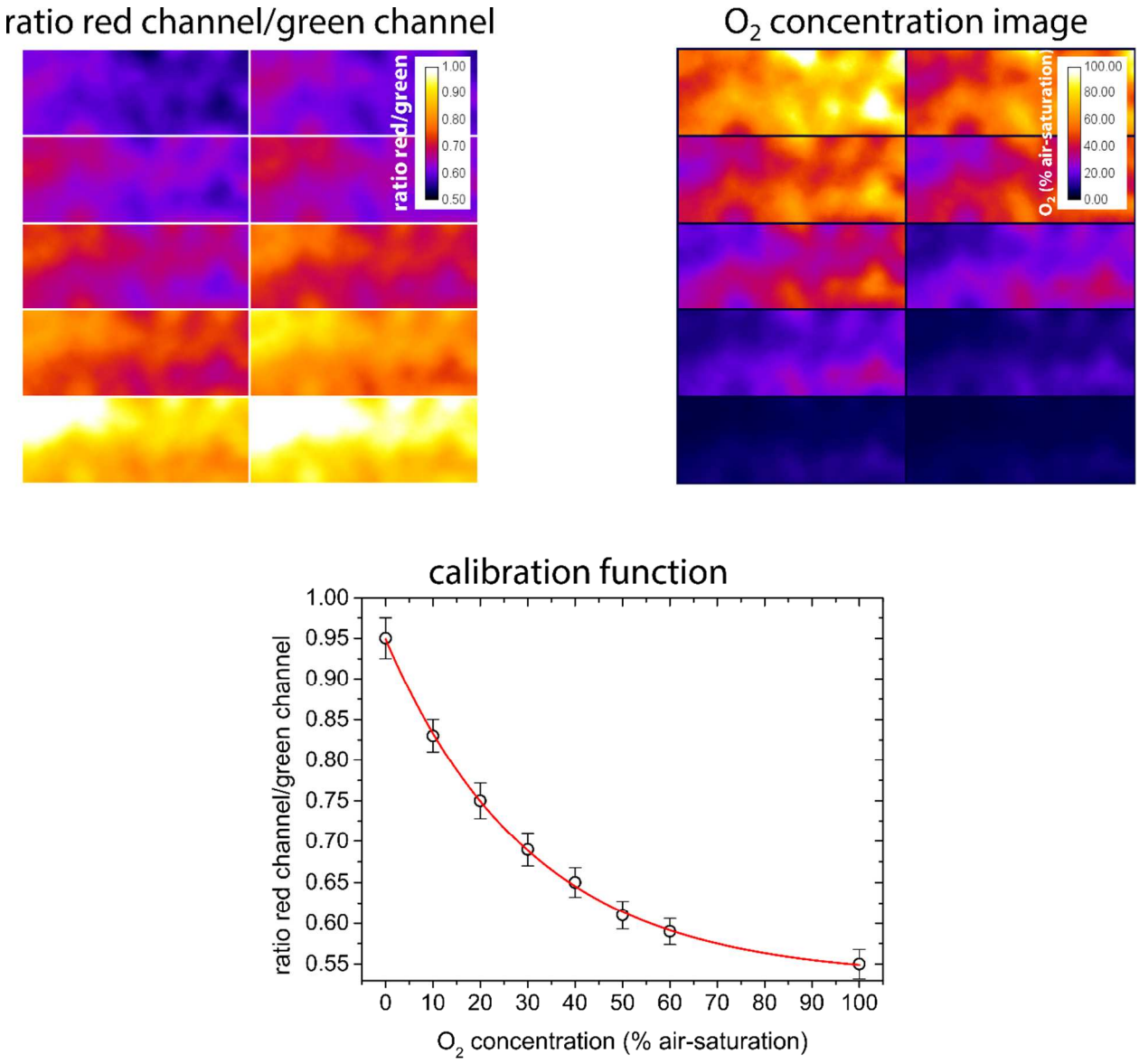
Optical sensor nanoparticles in artificial sediments – a new tool to visualize O_2 dynamics around the rhizome and roots of seagrasses and other aquatic macrophytes

Klaus Koren[a‡*], Kasper E. Brodersen[b‡], Sofie L. Jakobsen[a], Michael Kühl[a,b,c*]

a Marine Biological Section, Department of Biology, University of Copenhagen, Helsingør, Denmark

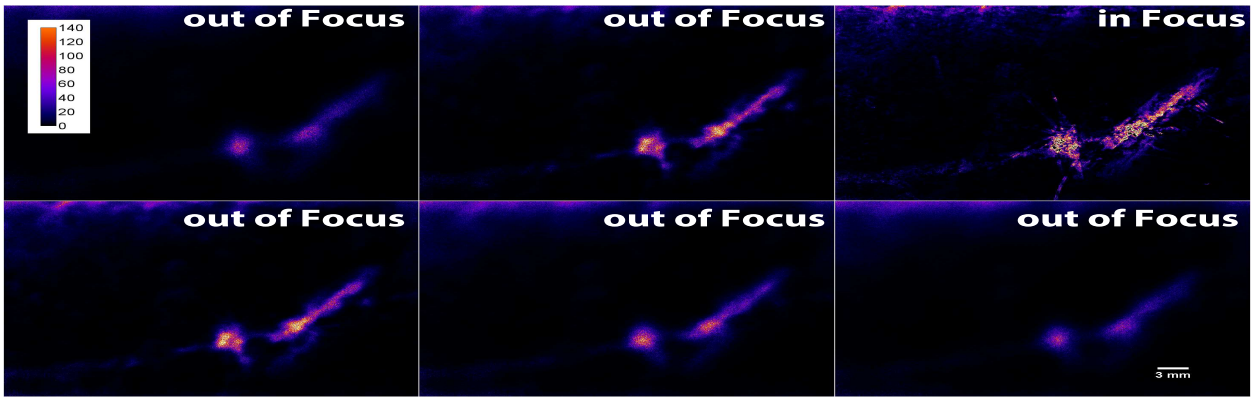
b Plant Functional Biology and Climate Change Cluster, University of Technology Sydney, Australia

c Singapore Centre on Environmental Life Sciences Engineering, School of Biological Sciences, Nanyang Technological University, Singapore



Supporting Figure 1: Visualization of the calibration process.

Acquired images were split into red, green, and blue channels and analyzed using the freely available software ImageJ (http://rsbweb.nih.gov/ij/). In order to obtain O_2 concentration images the following steps were performed: First the red channel (O_2 sensitive emission of PtTFPP) and green channel (emission of the reference dye MY) images were divided using the ImageJ plugin Ratio Plus (http://rsb.info.nih.gov/ij/plugins/ratio-plus.html). This resulted in images as shown in the top left panel. For the calibration, the obtained ratio images were correlated to the measured O_2 levels in the water column. There different regions were measured and used to generate the calibration plot. This calibration curve was then used to convert ratio images to an O_2 concentration images (top right).



Supporting Figure 2: O_2 concentration images (scale in % air saturation) recorded in focus with the rhizome and out of focus. It can be seen that in the focal plane of the rhizome the greatest level of detail can be obtained. Out of focus the picture gets blurry and only parts of the structures can be visualized.

For planar optrodes, this can be a resolution limiting factor as close contact of the rhizome to the optrode is needed.