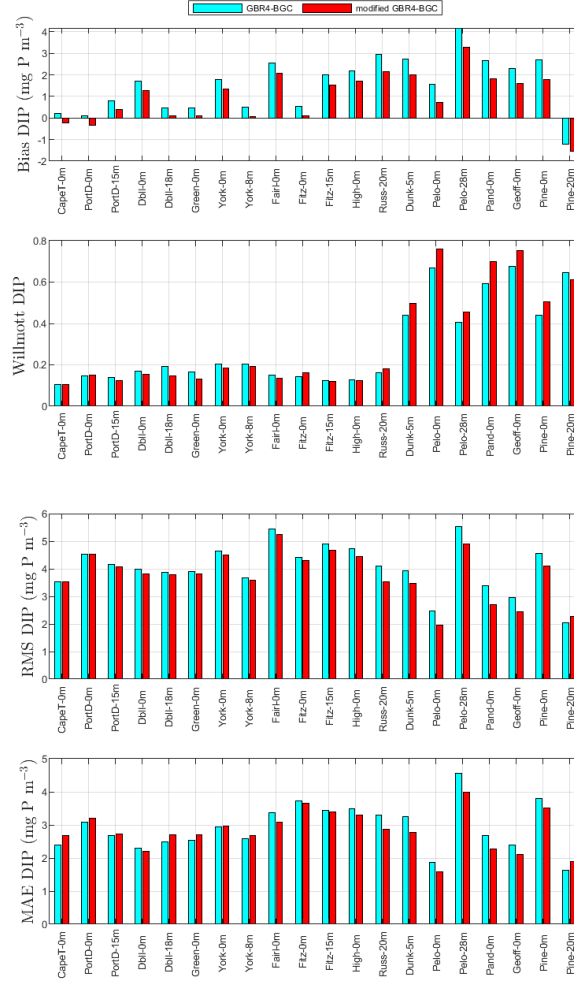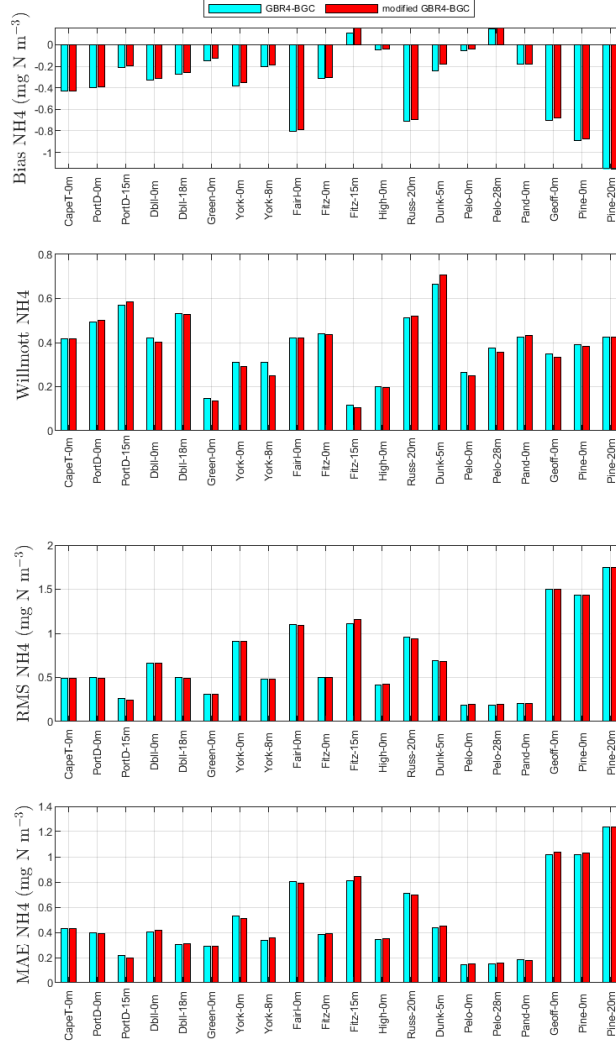# Supplementary Information for:
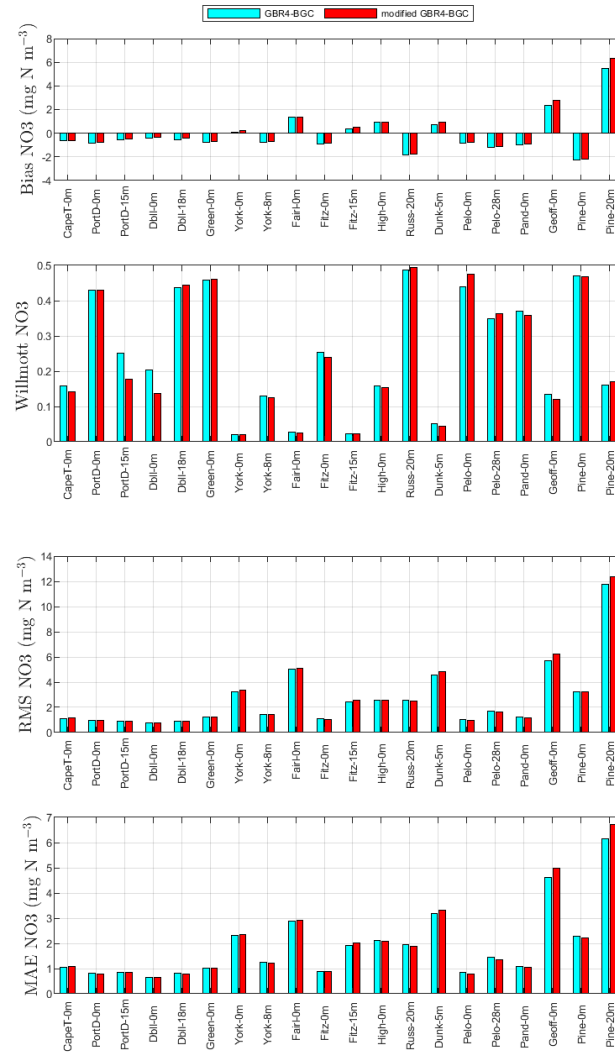
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Supplementary Figure S1: From top to bottom: bias, Willmott score, root mean square error and mean absolute error for simulated dissolved inorganic phosphorus (DIP) versus monthly observations of surface DIP concentrations from December 2010 to November 2012 [Moran et al., 2022]. Sites are arranged from North to South. Water quality sampling was done at more than one depth at some sites. The x-axis labels represent the short form of the station name followed by the depth in metres below the surface. Index of short names to full station names: CapeT = "Cape Tribulation"; PortD = "Port Douglas"; DblI = "Double Island"; Green = "Green Island"; York = "Yorkeys Knob"; Fairl = "Fairlead Buoy"; Fitz = "Fitzroy Reef"; High = "High Island"; Russ = "Russell Island"; Dunk = "Dunk Island"; Pelo = "Pelorus Island"; Pand = "Pandora Island"; Geoff = "Geoffery Bay"; Pine = "Pine Island". "GBR4-BGC" corresponds to the version of the model described in [Baird et al., 2020] whereas "modified GBR4-BGC" is the modified model.

Supplementary Figure S2: From top to bottom: bias, Willmott score, root mean square error and mean absolute error for simulated ammonium versus monthly observations from December 2010 to November 2012. Sites are arranged from North to South. "GBR4-BGC" corresponds to the version of the model described in [Baird et al., 2020] whereas "modified GBR4-BGC" is the modified model. See Figure S1 for more information on sites.

Supplementary Figure S3: From top to bottom: bias, Willmott score, root mean square error and mean absolute error for simulated nitrate versus monthly observations from December 2010 to November 2012. Sites are arranged from North to South. "GBR4-BGC" corresponds to the version of the model described in [Baird et al., 2020] whereas "modified GBR4-BGC" is the modified model. See Figure S1 for more information on sites.

References

M. Baird, K. Wild-Allen, J. Parslow, M. Mongin, B. Robson, J. Skerratt, F. Rizwi, M. Soja-Wozniak, E. Jones, M. Herzfeld, et al. CSIRO Environmental Modelling Suite (EMS): scientific description of the optical and biogeochemical models (vB3p0). *Geoscientific Model Development*, 13:4503–4553, 2020.

D. Moran, B. Robson, R. Gruber, J. Waterhouse, M. Logan, C. Petus, S. Lewis, D. Tracey, C. James, J. Mellors, U. Bove, J. Davidson, K. Glasson, S. Jaworski, C. Lefevre, A. Macadam, M. Shanahan, R. Vasile, I. Zagorskis, and J. Shellberg. Marine Monitoring Program: Annual Report for Inshore Water Quality Monitoring 2020-21. Report for the Great Barrier Reef Marine Park Authority. *Great Barrier Reef Marine Park Authority, Townsville*, 2022.