CREH

CENTRE FOR RESEARCH INTO ENVIRONMENT AND HEALTH

Ressessment of the trophic status of St Aubin's Bay, Jersey 2009-2010

A Report to
Transport and Technical Services, States of Jersey

[redacted]

November 2010

Figures

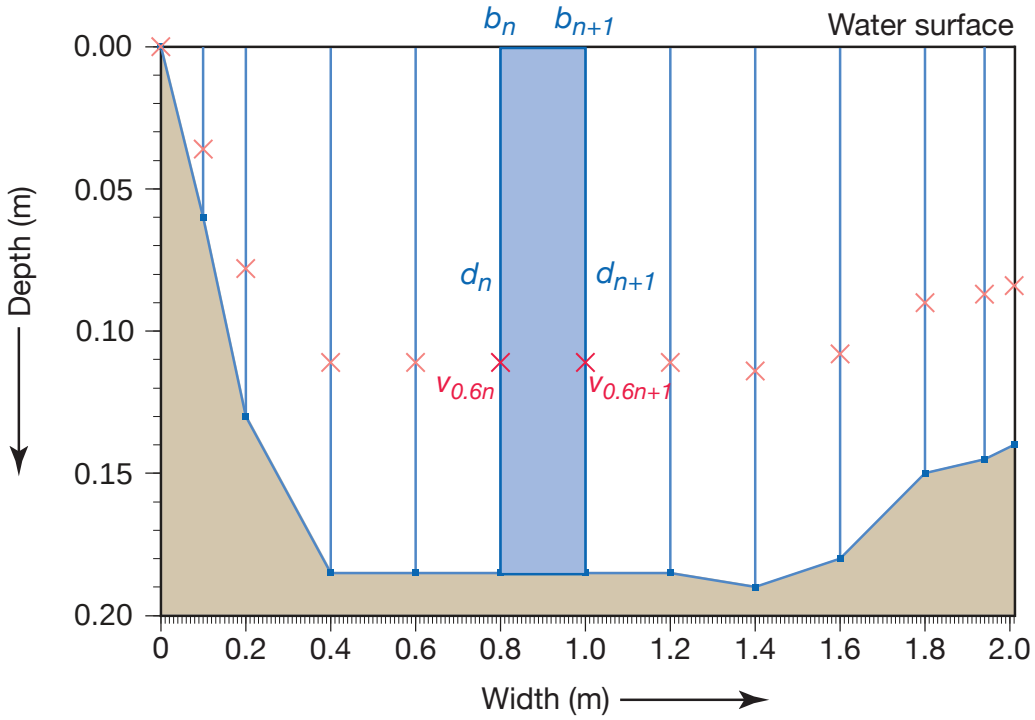


Figure 2.2 Discharge gauging example (based on the profile at St Peter's Valley, site 104a, 14th May 2007)

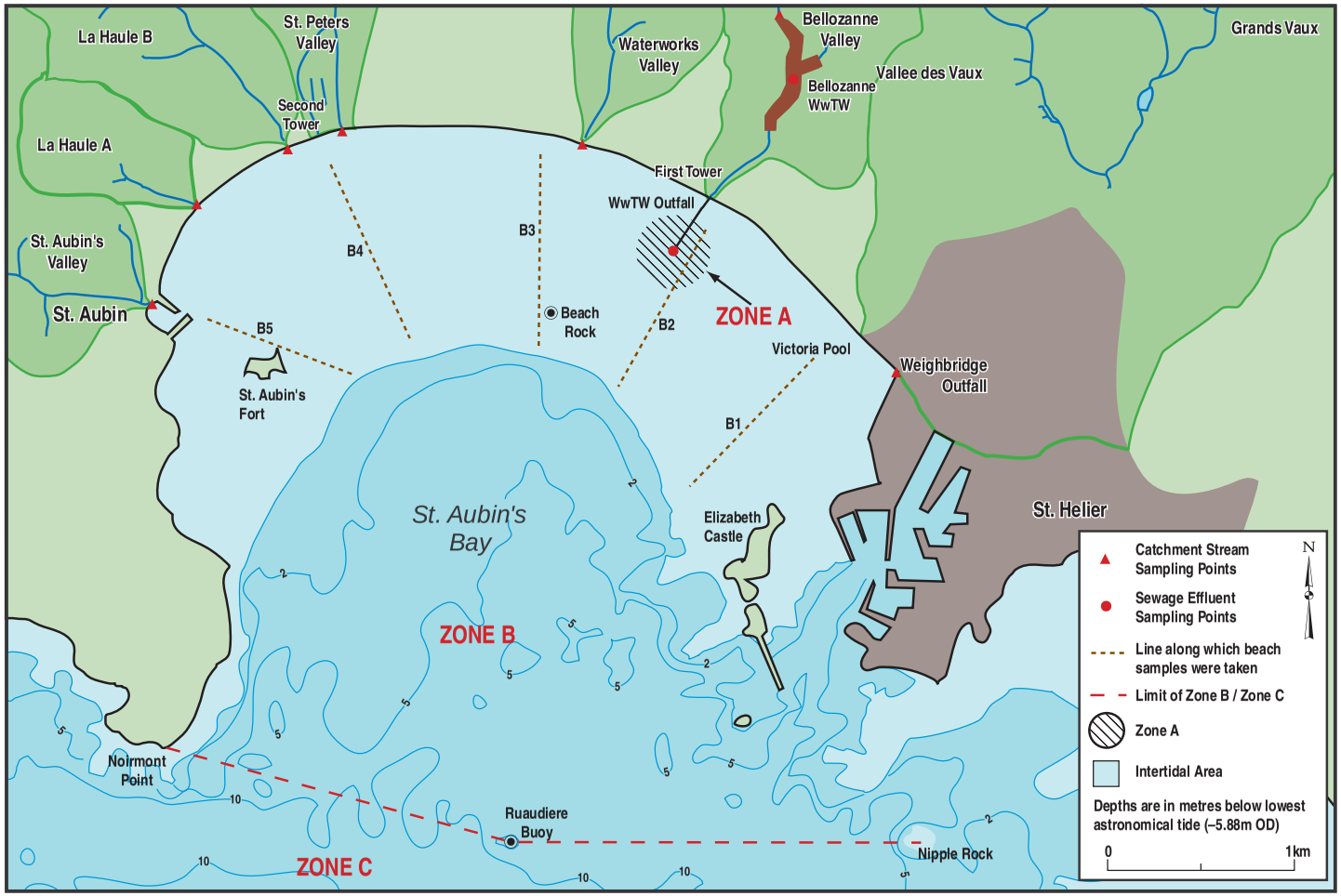


Figure 2.3 Location of nearshore surf zone sample sites and offshore survay zones used for the classification of samples

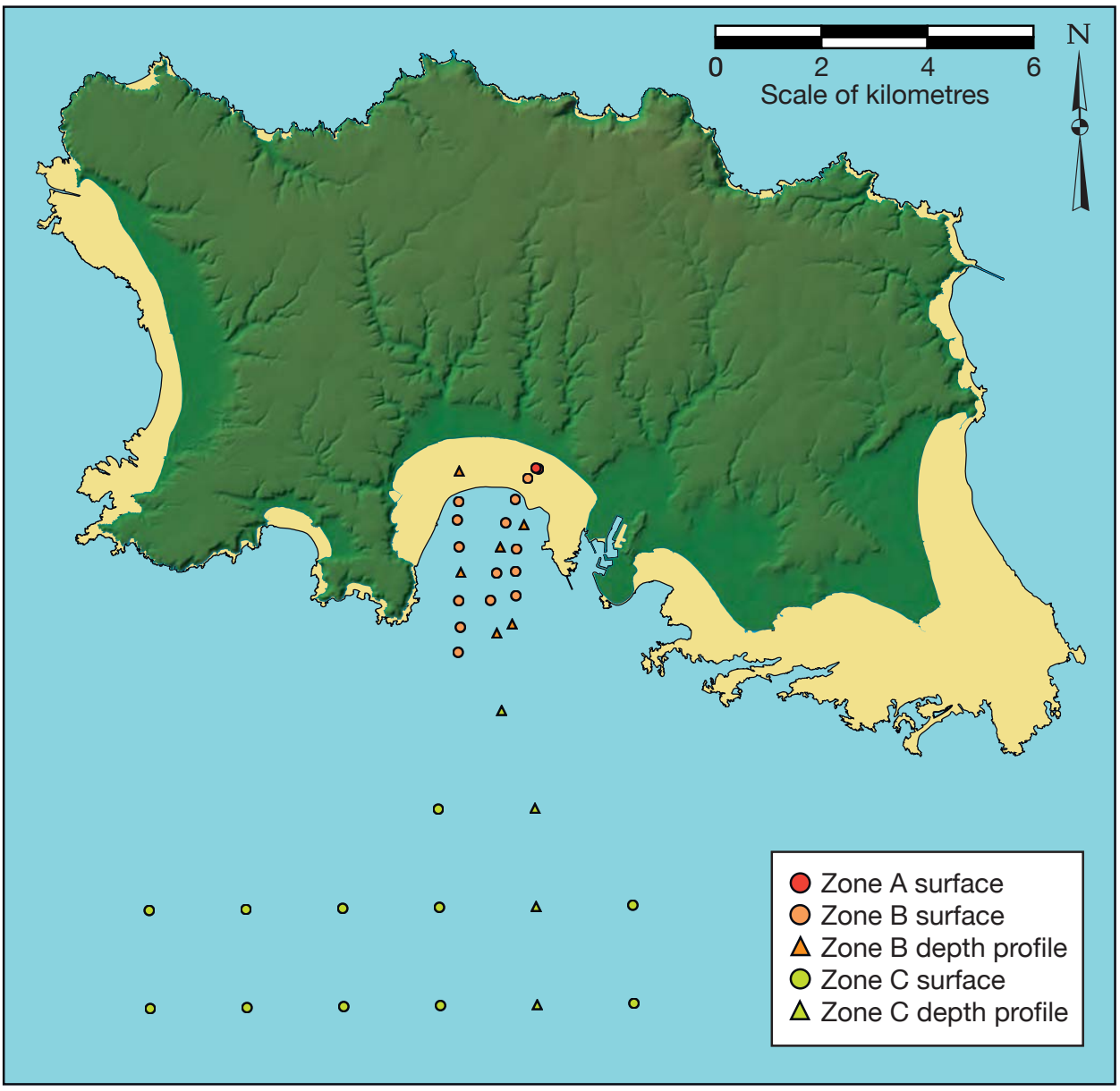


Figure 2.4 Location of offshore sampling sites in zones A, B and C

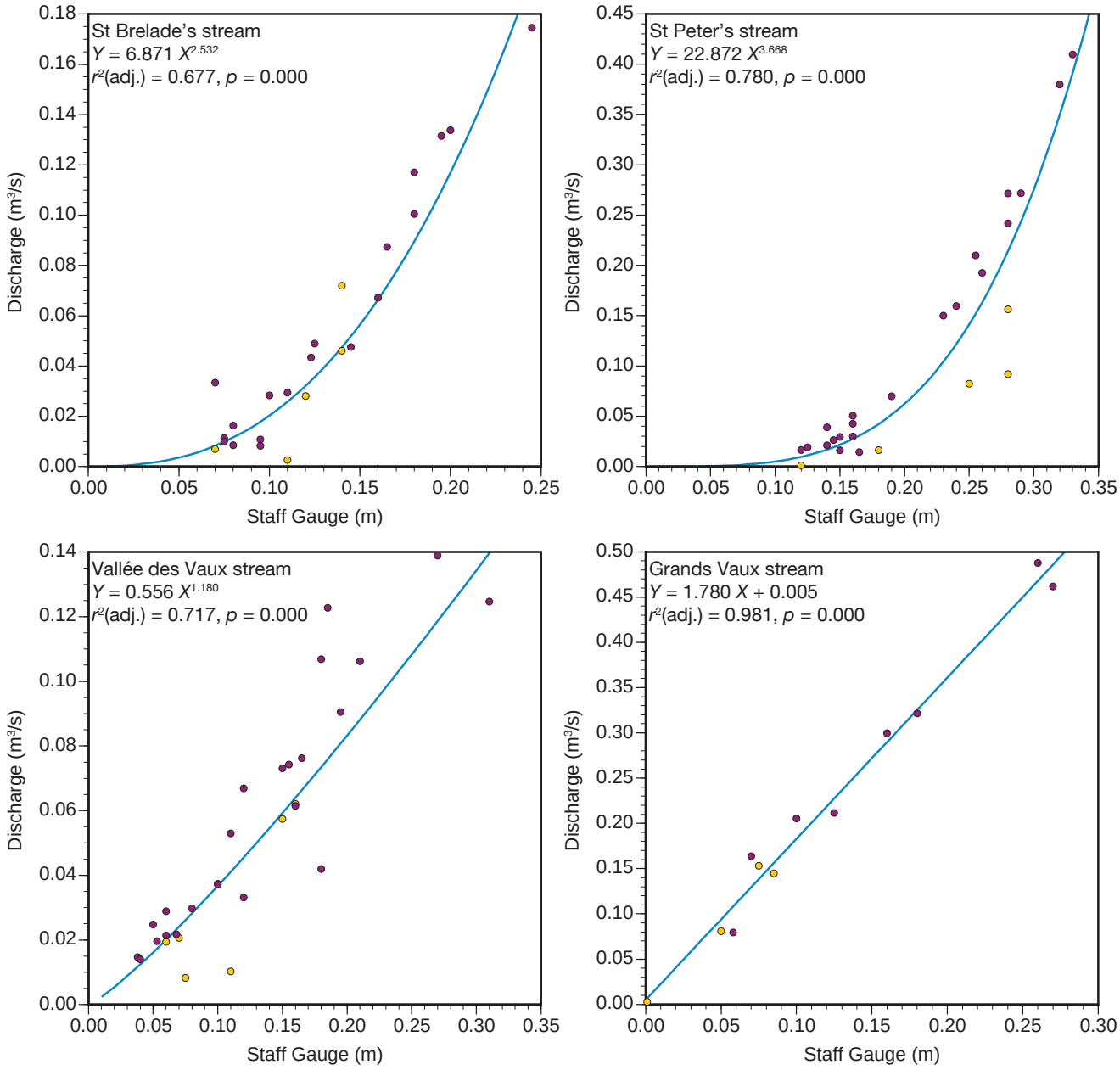


Figure 3.1 Stage (m) - discharge (m^3/s) rating curves for discharge gauging sites

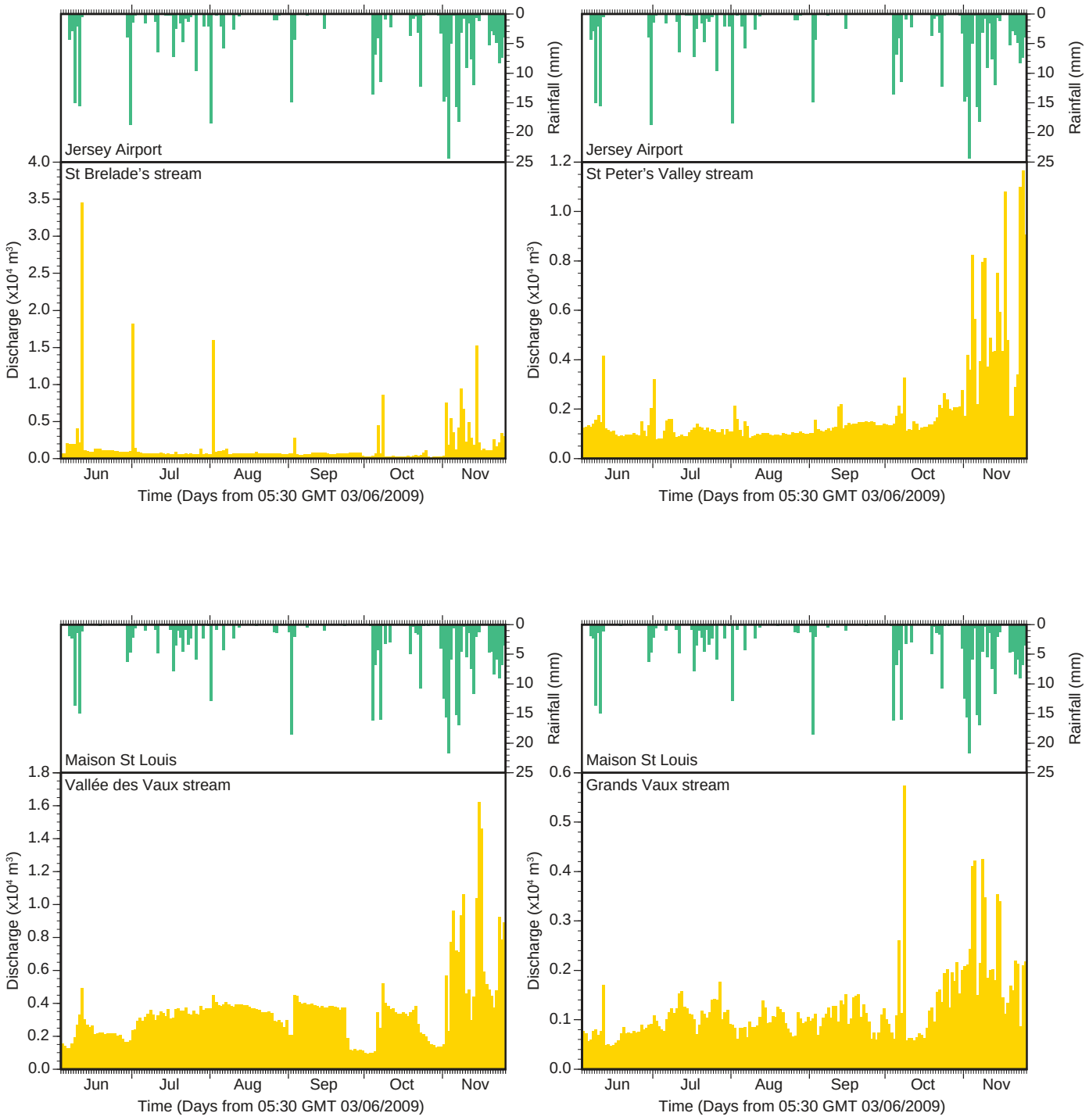


Figure 3.2 Daily discharge (m^3) at stream gauging sites and rainfall (mm) at the closest rain gauge during the 2009 study period

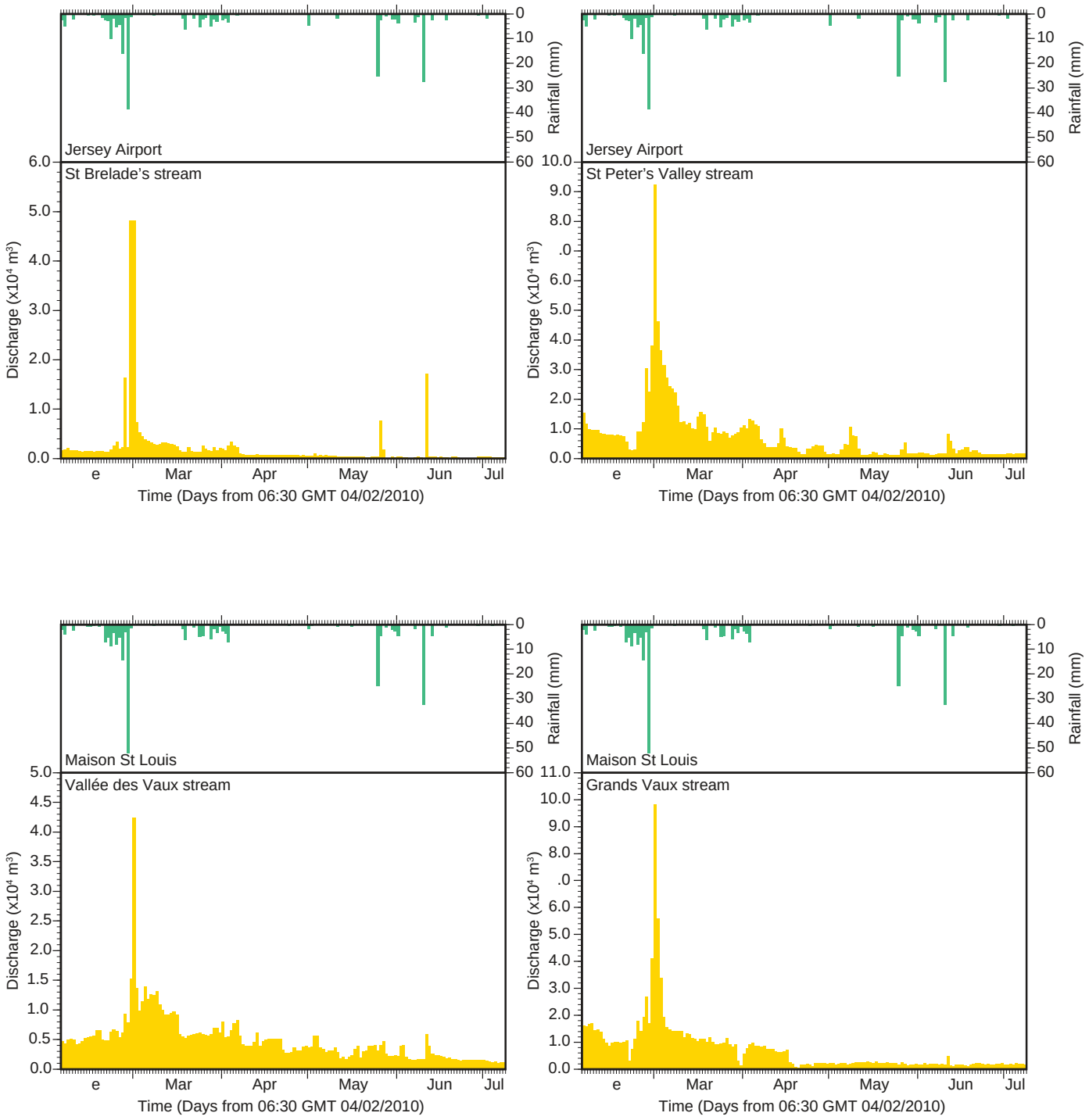


Figure 3.3 Daily discharge (m^3) at stream gauging sites and rainfall (mm) at the closest rain gauge during the 2010 study period

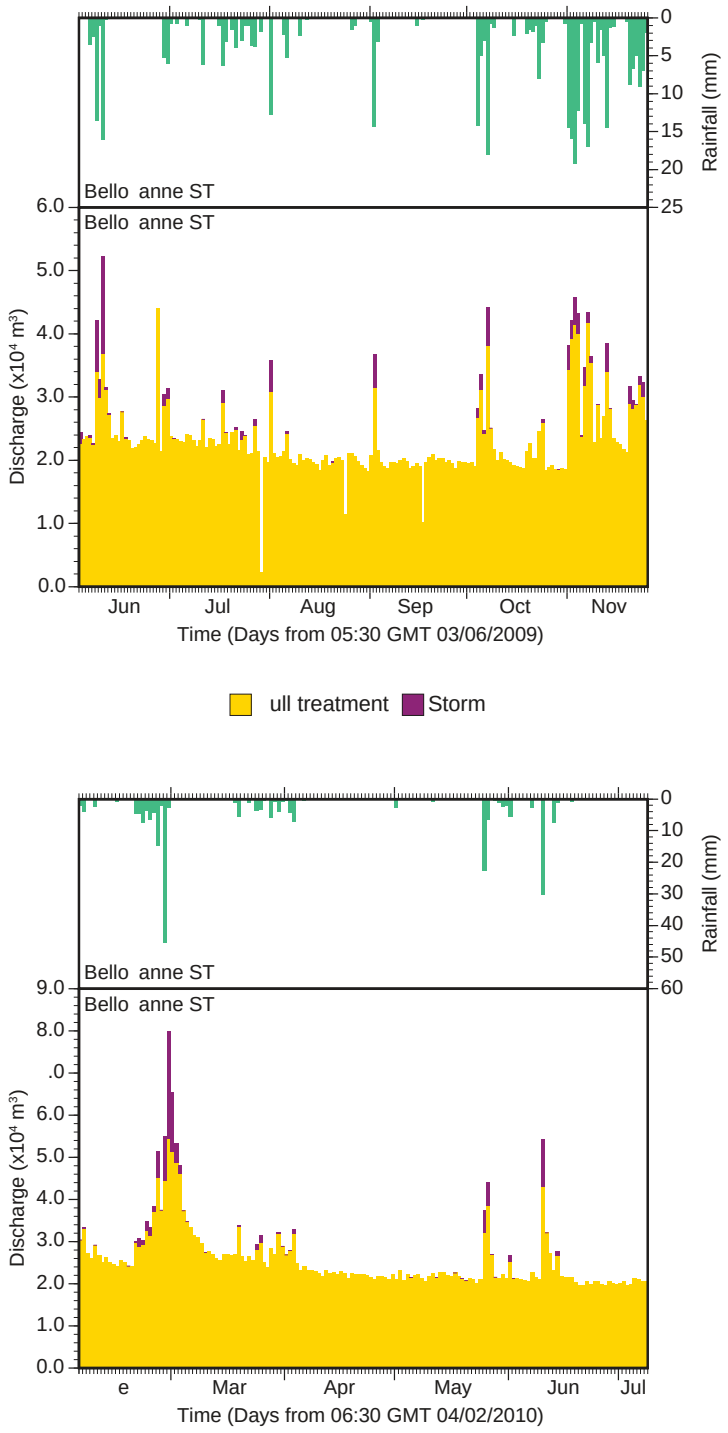


Figure 3.4 Daily discharge (m^3) at and rainfall (mm) at Bellozanne sewage treatment works during the 2009 and 2010 study periods

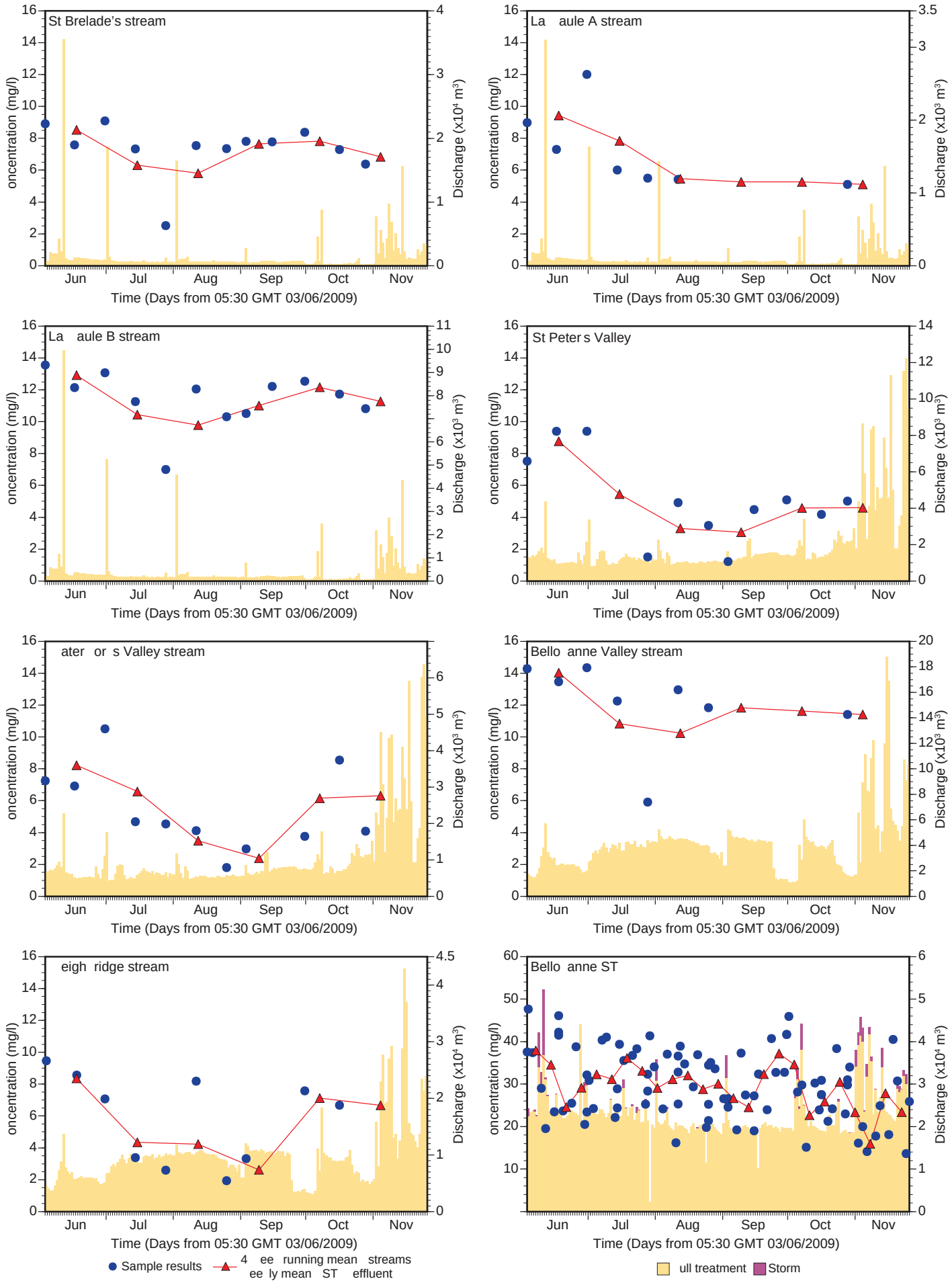


Figure 3.5 Dissolved available inorganic nitrogen concentrations (mg/l) and estimated daily discharge (m³) in surface water stream and sewage effluent inputs to St Aubin's Bay June to November 2009

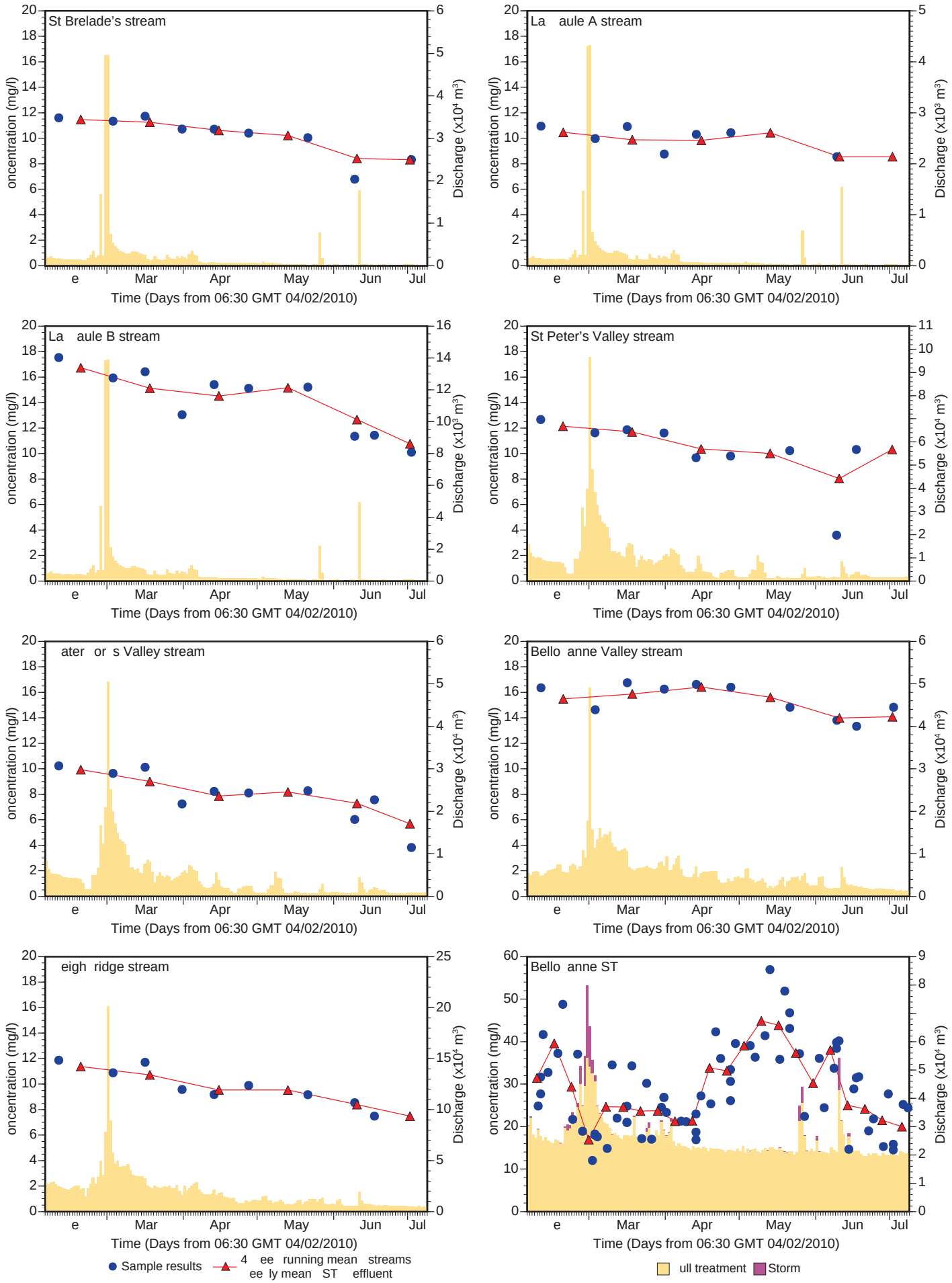


Figure 3.6 Dissolved available inorganic nitrogen concentrations (mg/l) and estimated daily discharge (m³) in surface water stream and sewage effluent inputs to St Aubin's Bay February to July 2010

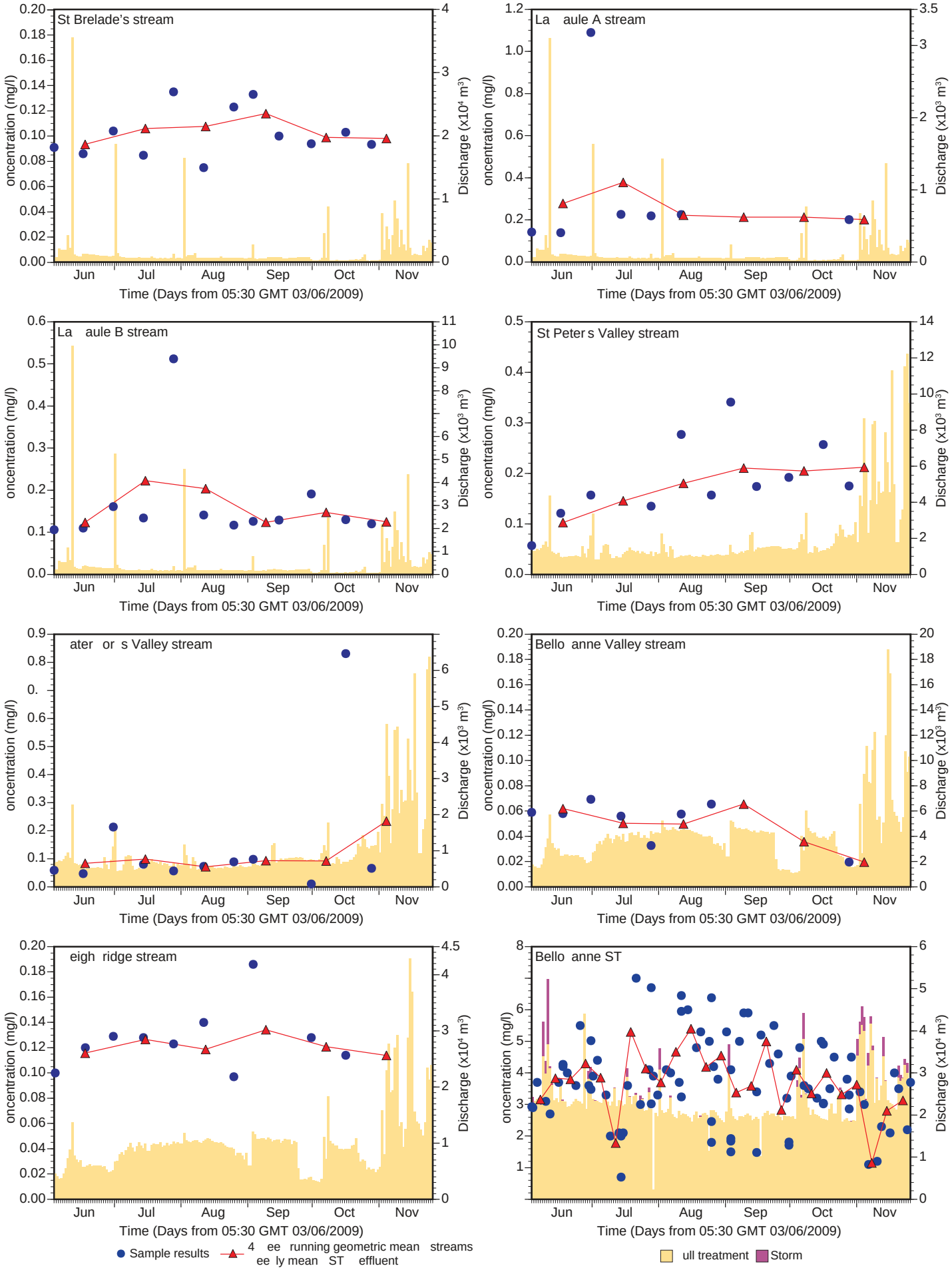


Figure 3.7 Dissolved available inorganic phosphorus concentrations (mg/l) and estimated daily discharge (m³) in surface water stream and sewage effluent inputs to St Aubin's Bay June to November 2009

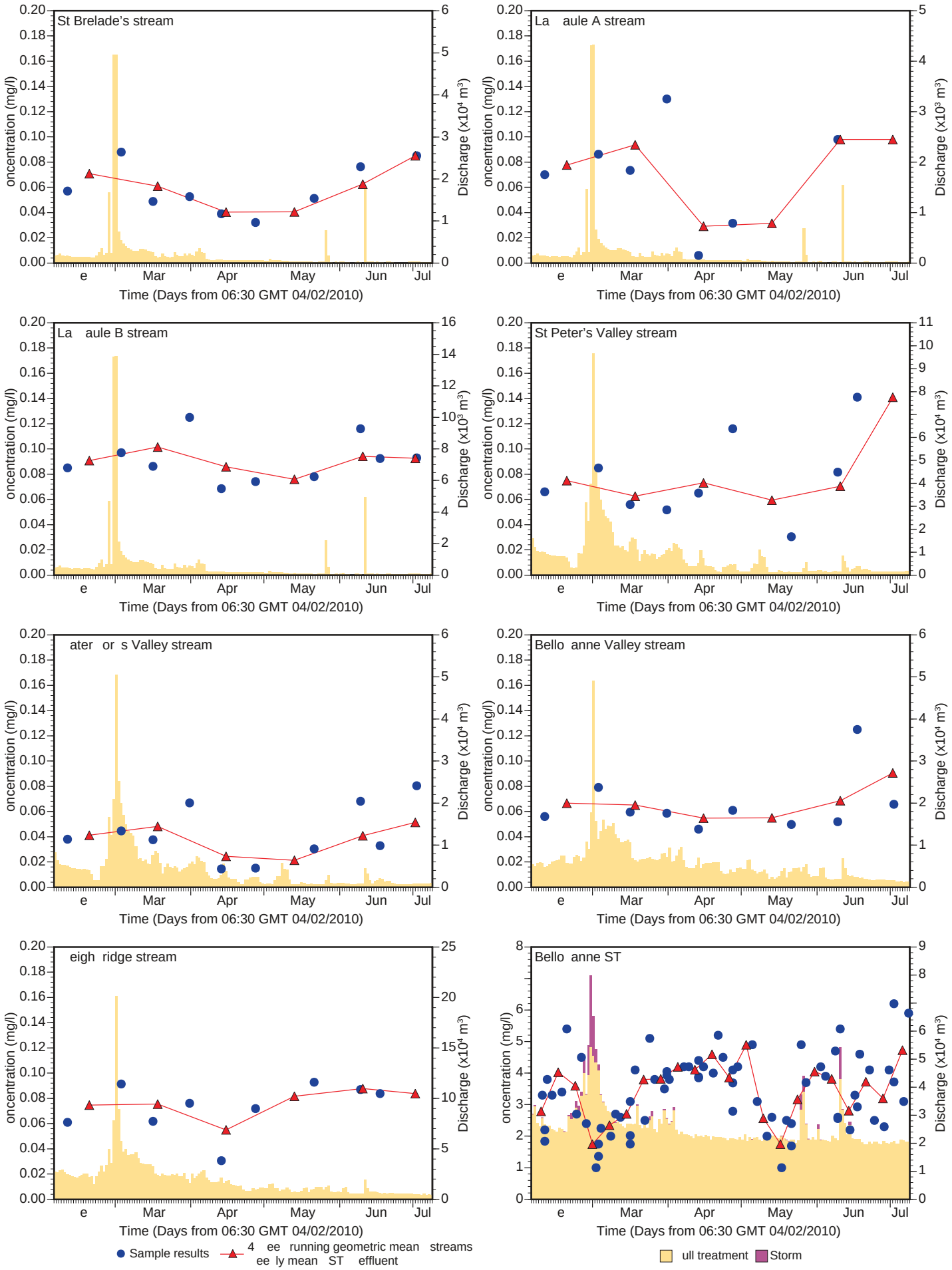
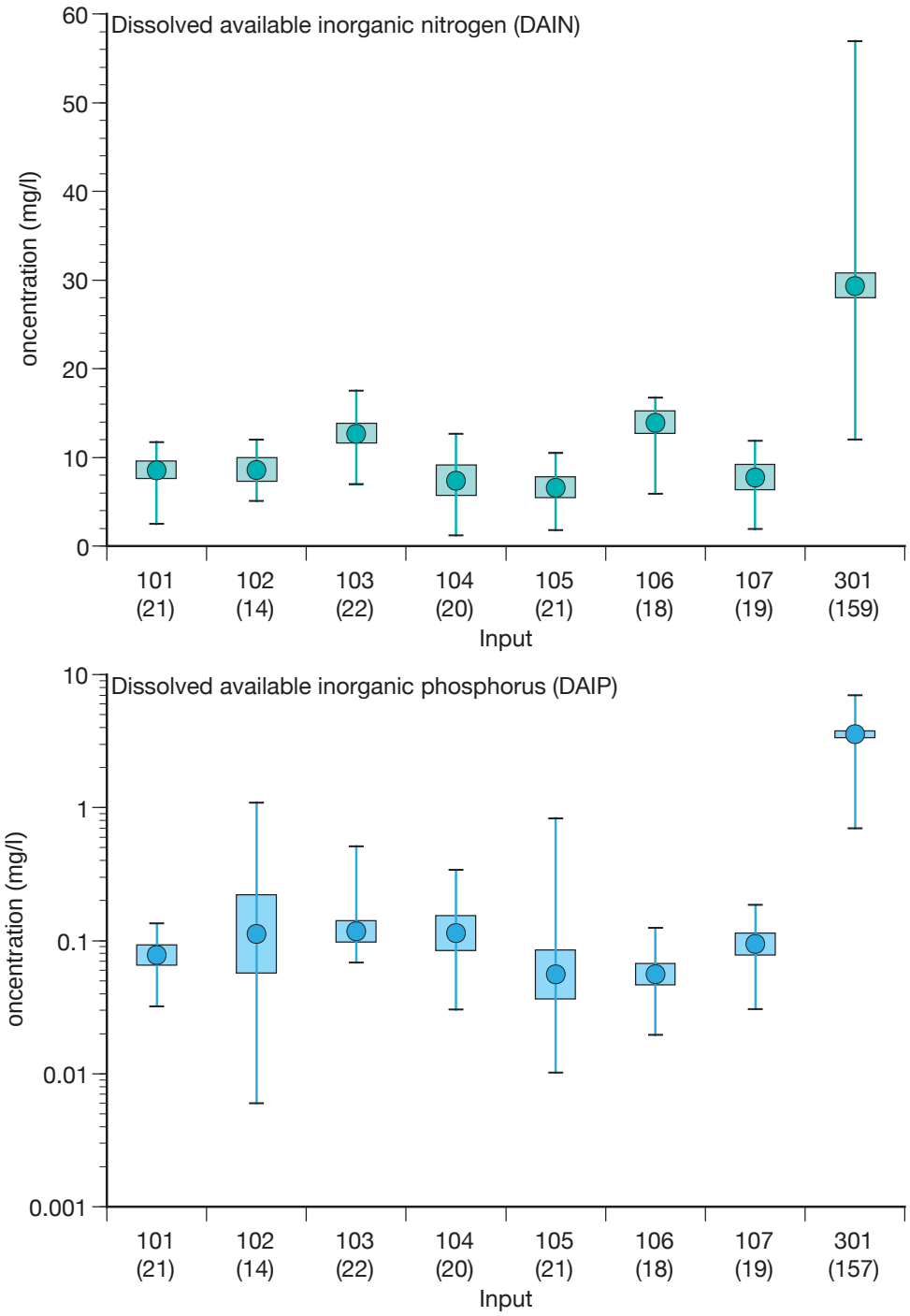


Figure 3.8 Dissolved available inorganic phosphorus concentrations (mg/l) and estimated daily discharge(m³) in surface water stream and sewage effluent inputs to St Aubin's Bay February to July 2010



Inputs:
101 St Brelade's stream
102 La Haule A stream
103 La Haule B stream
104 St Peter's Valley stream
105 Waterworks Valley stream
106 Bellozanne Valley stream
107 Weighbrdige stream
301 Bellozanne STW final effluent
Figures in parentheses denote the number of observations

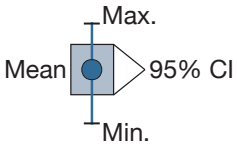


Figure 3.9 Mean (geometric in the case of DAIP in stream inputs), range and 95% confidence interval (CI, shaded boxes) for the mean of DAIN and DAIP concentrations (mg/l) in inputs to St Aubin's Bay 2009-2010

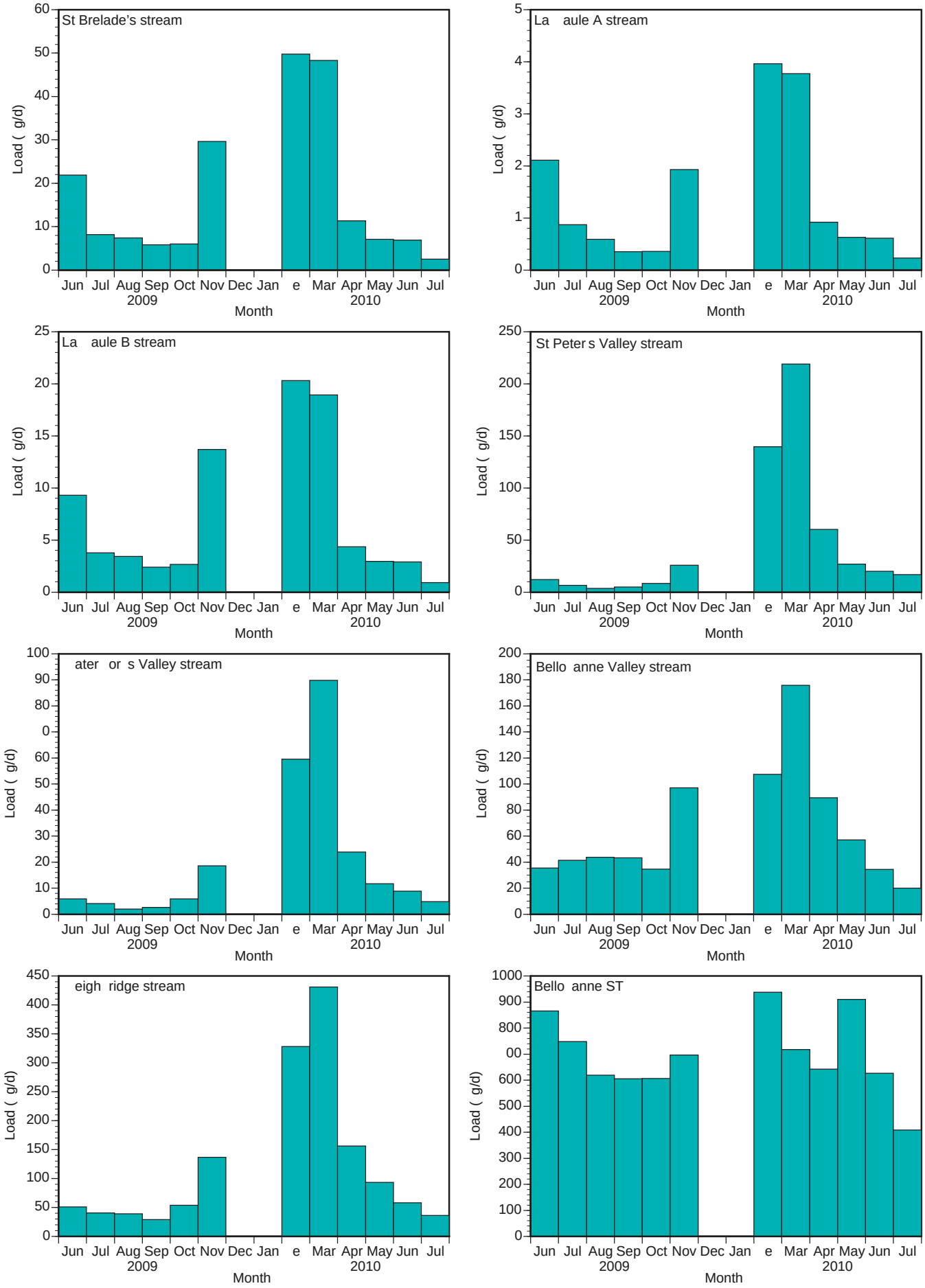


Figure 3.10 Estimated monthly dissolved available inorganic nitrogen flux (kg/d) from surface water stream and sewage treatment works (STW) effluent inputs to St Aubin's Bay during 2009 and 2010 study periods

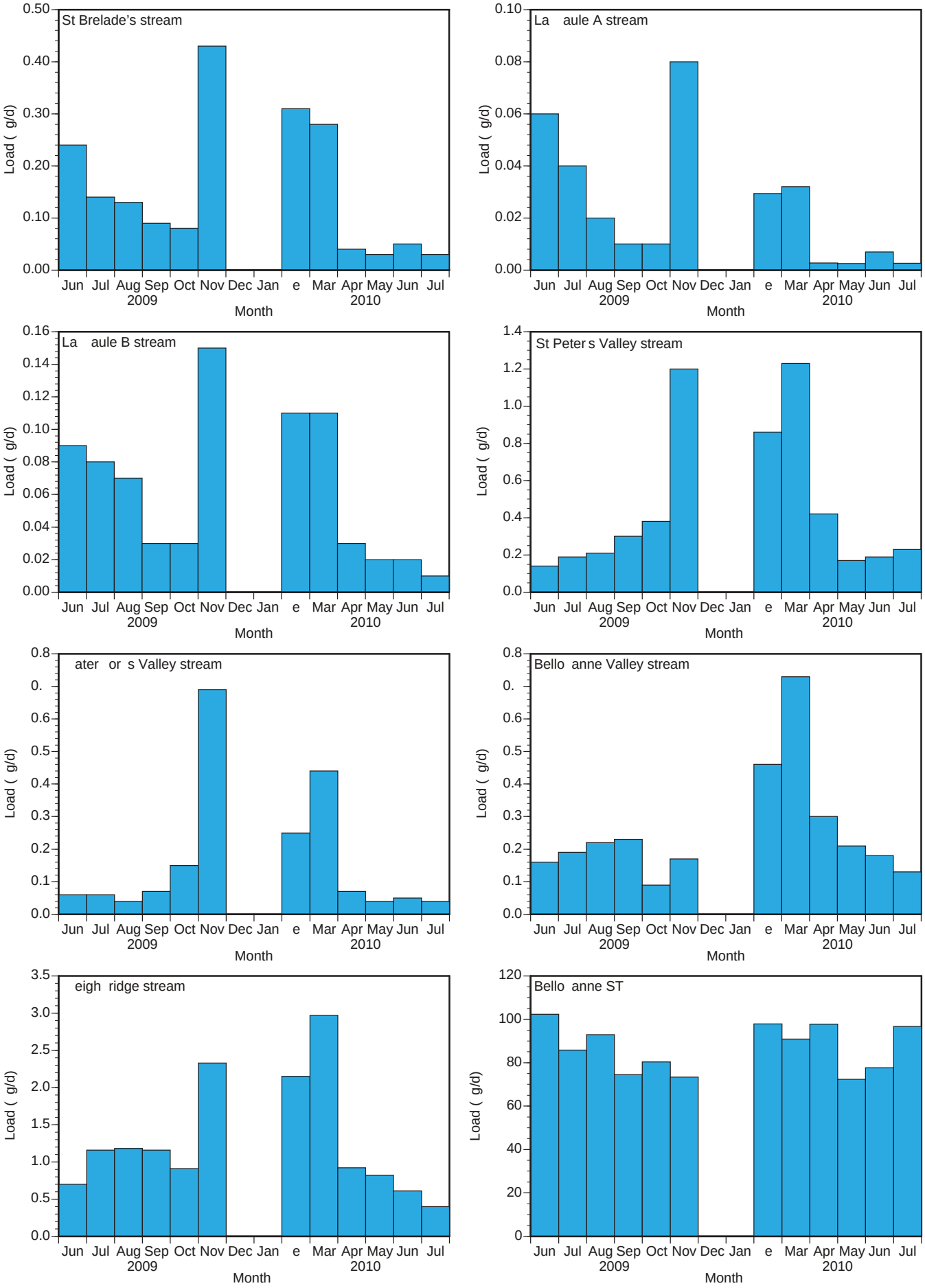


Figure 3.11 Estimated monthly dissolved available inorganic phosphorus flux (kg/d) from surface water stream and sewage treatment works (STW) effluent inputs to St Aubin's Bay during 2009 and 2010 study periods

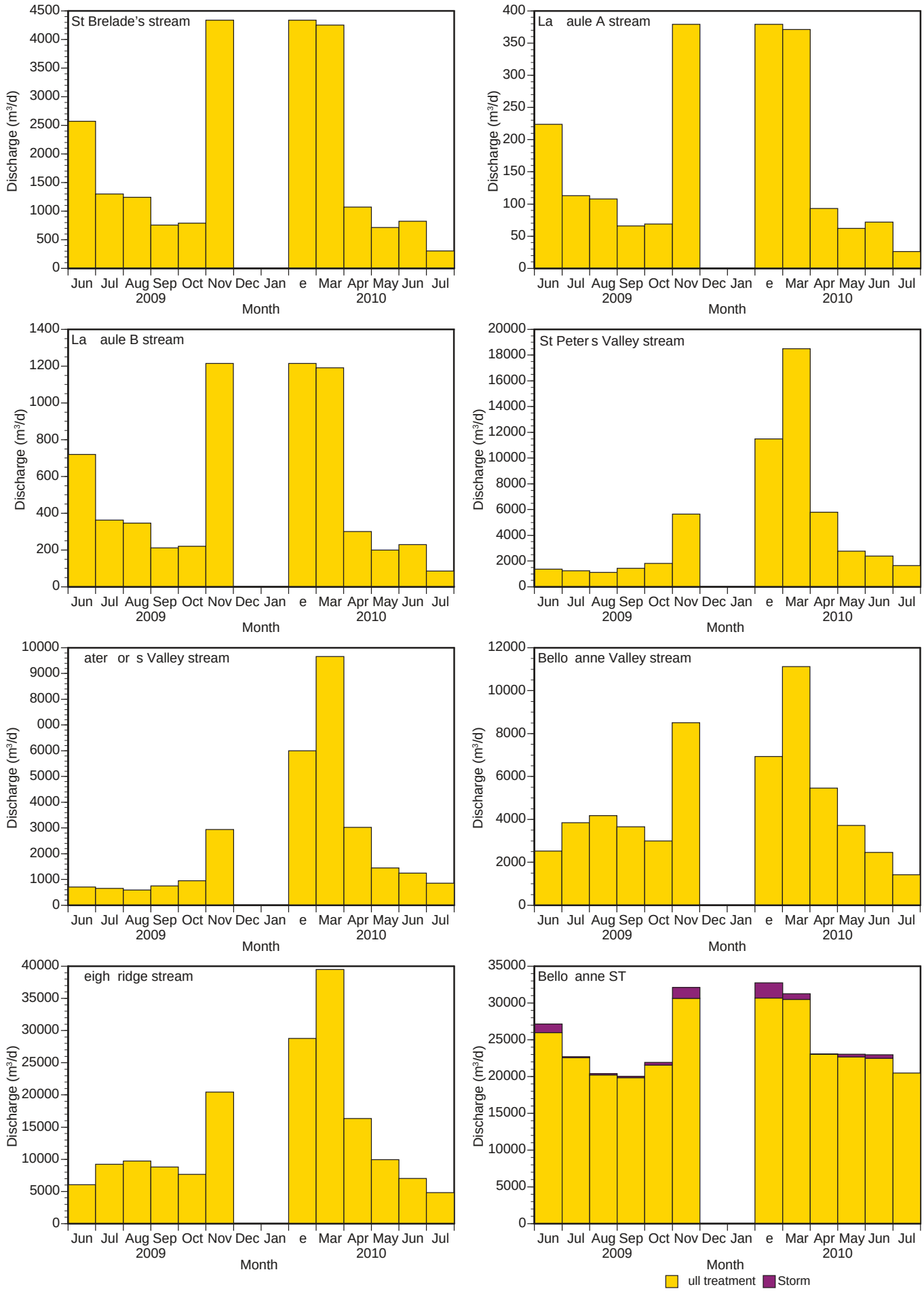


Figure 3.12 Estimated monthly discharge (m³/d) from surface water stream and sewage treatment works (STW) effluent inputs to St Aubin's Bay during 2009 and 2010 study periods

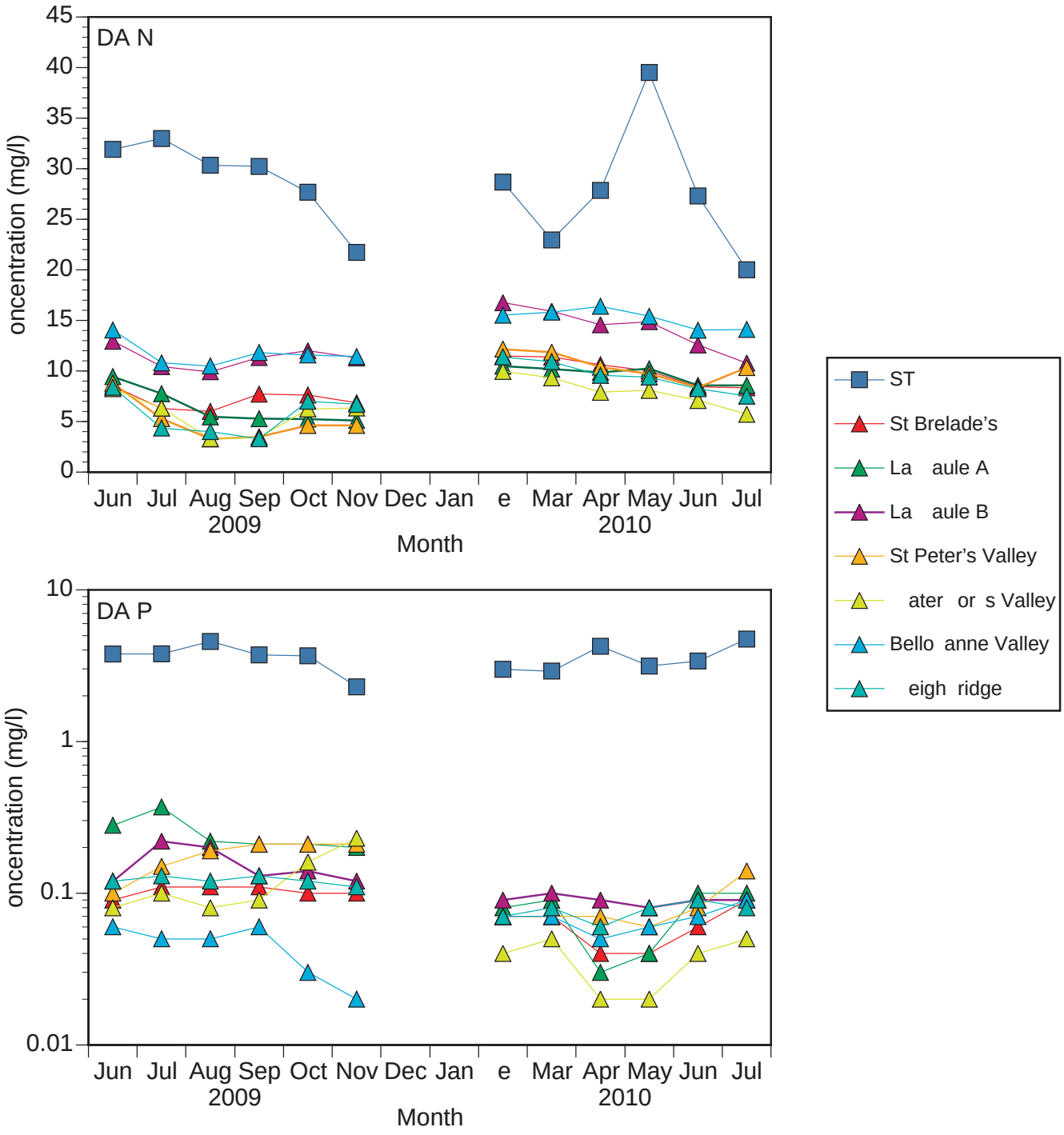


Figure 3.13 Monthly concentrations (mg/l) of dissolved available inorganic nitrogen (DAIN) and phosphorus (DAIP) in stream and sewage effluent inputs to St Aubin's Bay, estimated from monthly flux calculations

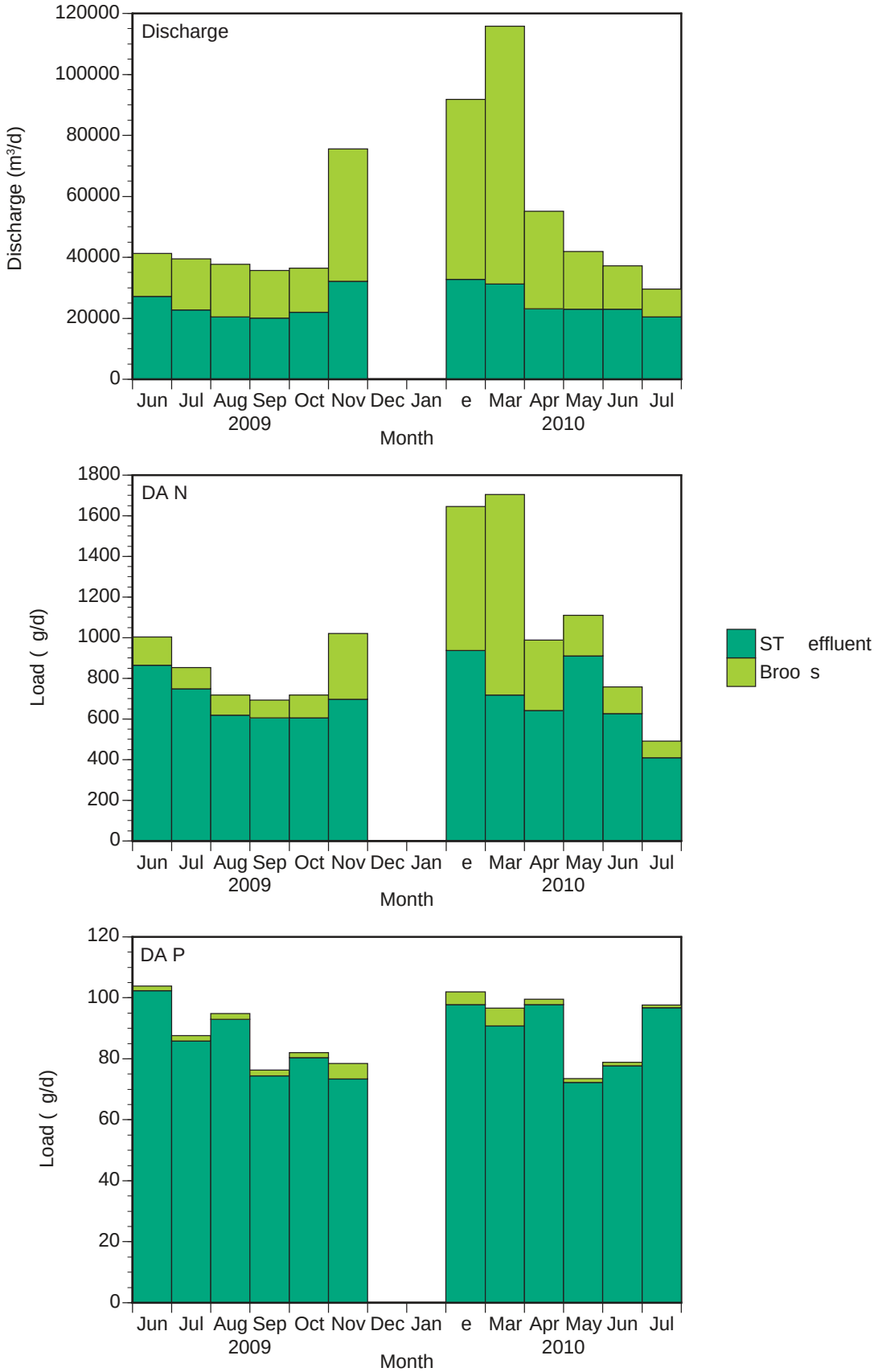


Figure 3.14 Estimated total monthly discharge (m^3) and flux of dissolved available inorganic nitrogen (DAIN, kg/d) and dissolved available inorganic phosphorus (DAIP, kg/d) from combined surface water stream inputs (brooks) and sewage treatment works (STW) effluent discharges to St Aubin's Bay during 2009 and 2010 study periods

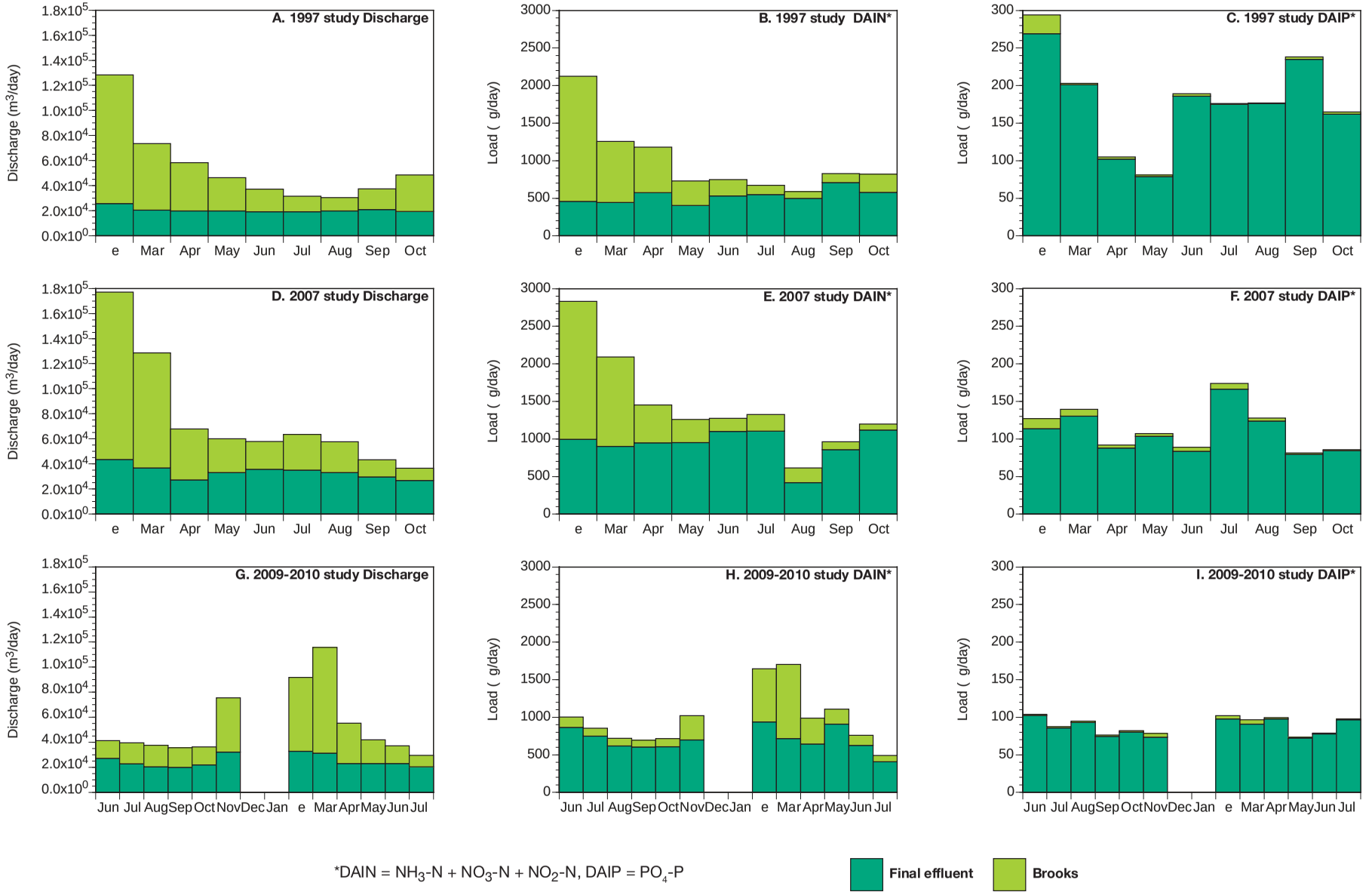


Figure 3.15 Comparison of monthly discharge (m^3/day), dissolved avvailable inorganic nitrogen (DAIN) and phosphorus (DAIP) load (kg/day) estimates to St Aubin's Bay during three studies undertaken in 1997, 2007 and 2009-2010

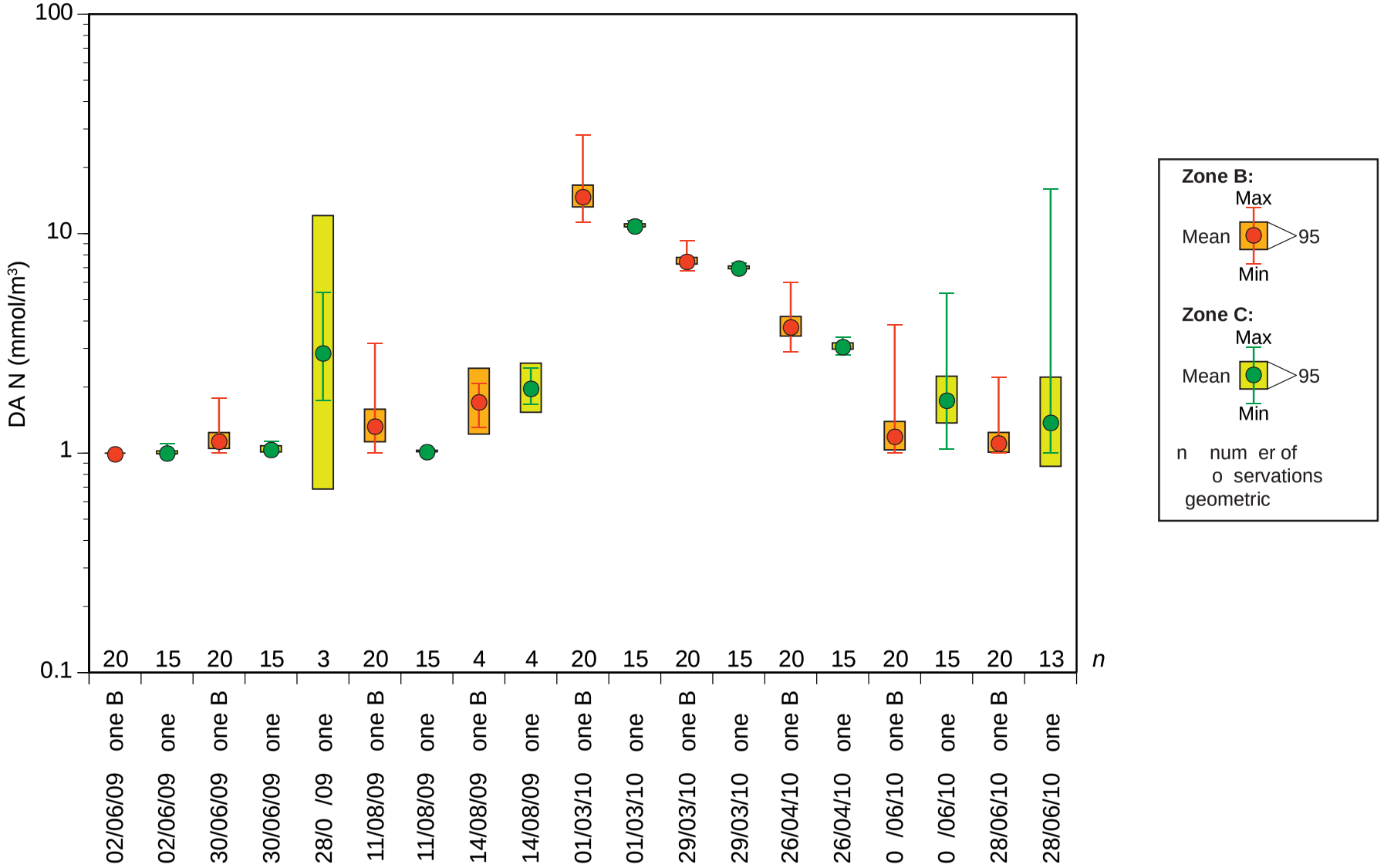


Figure 3.16 **Geometric mean, range and 95% confidence interval (CI, shaded boxes) for the mean of dissolved available inorganic nitrogen (DAIN) concentrations in zone B and zone C from surveys undertaken in 2009 and 2010.**

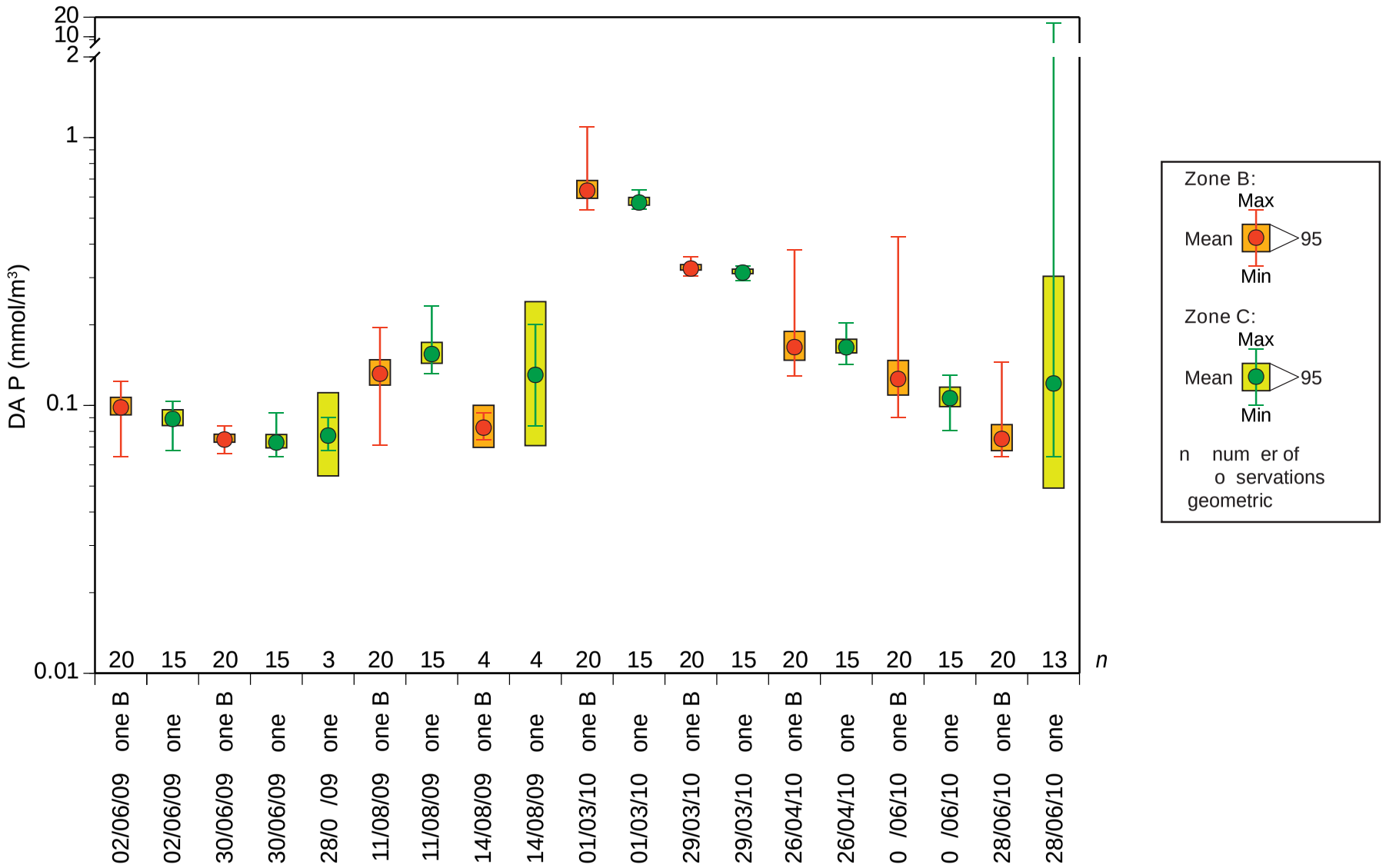


Figure 3.17 **Geometric mean, range and 95% confidence interval (CI, shaded boxes) for the mean of dissolved available inorganic phosphorus (DAIP) concentrations in zone B and zone C from surveys undertaken in 2009 and 2010.**

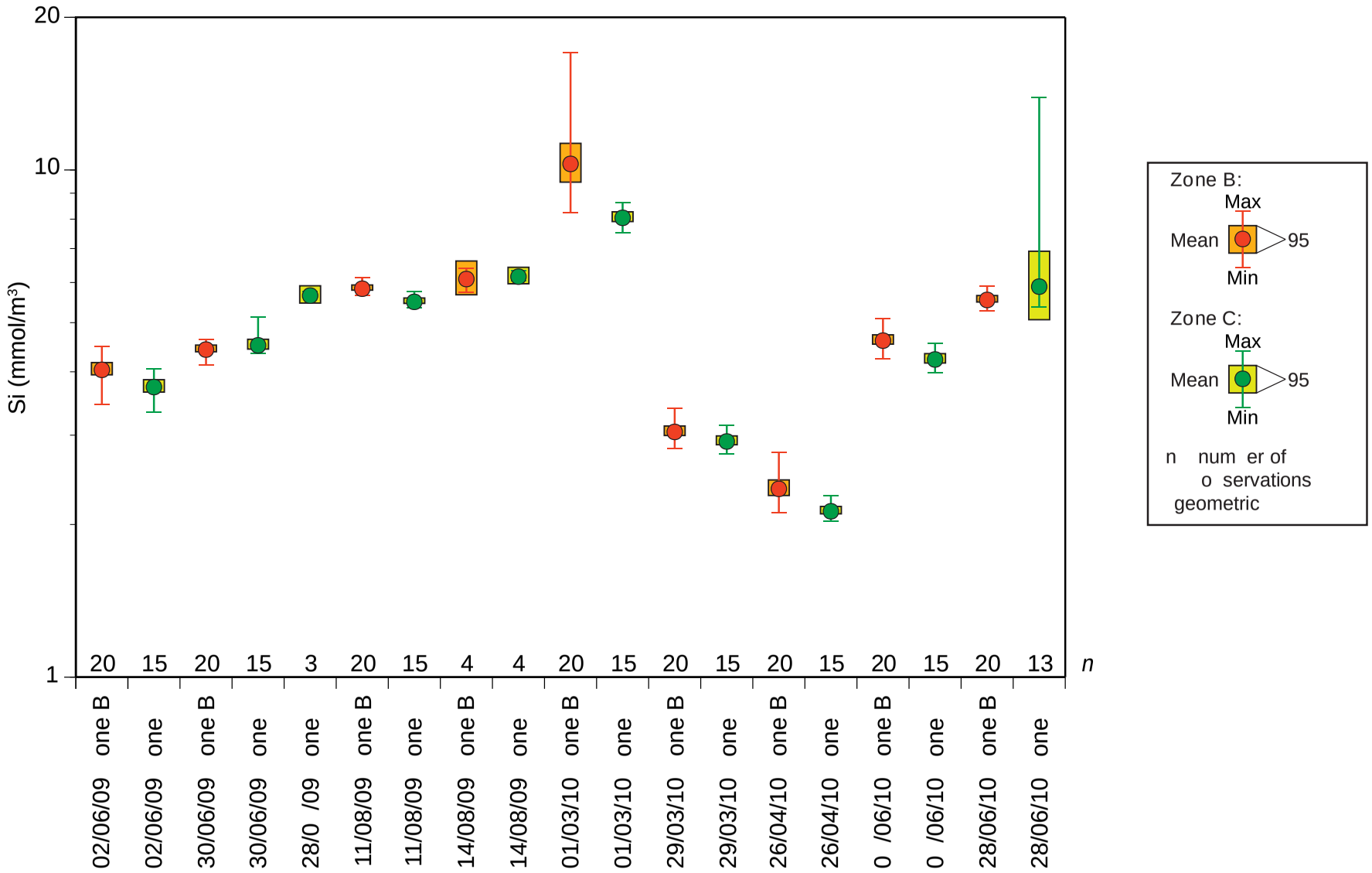


Figure 3.18 Geometric mean, range and 95% confidence interval (CI, shaded boxes) for the mean of dissolved reactive silicon (DRS) concentrations in zone B and zone C from surveys undertaken in 2009 and 2010.

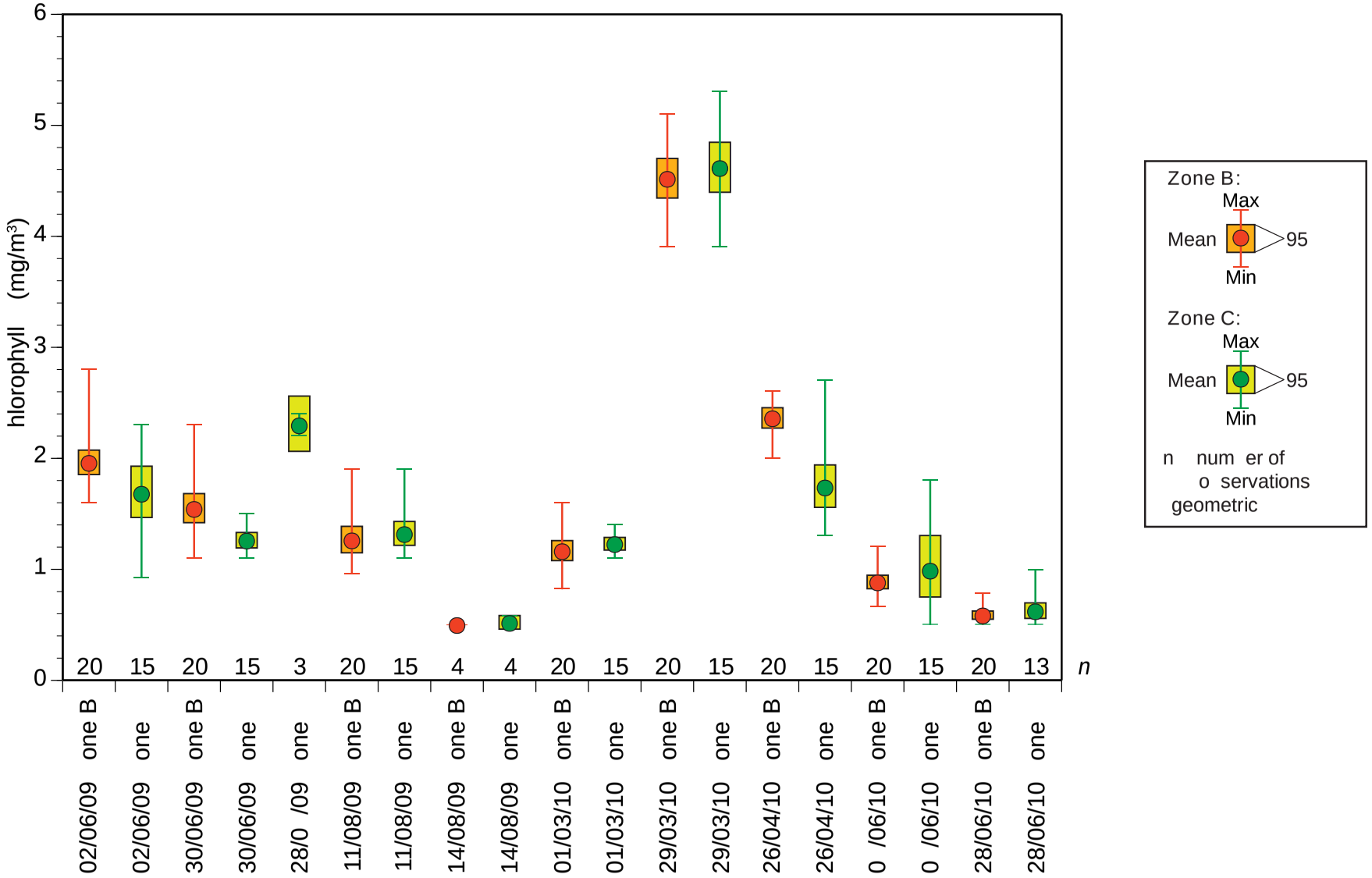


Figure 3.19 **Geometric mean, range and 95% confidence interval (CI, shaded boxes) for the mean of Chlorophyll *a* concentrations in zone B and zone C from surveys undertaken in 2009 and 2010.**

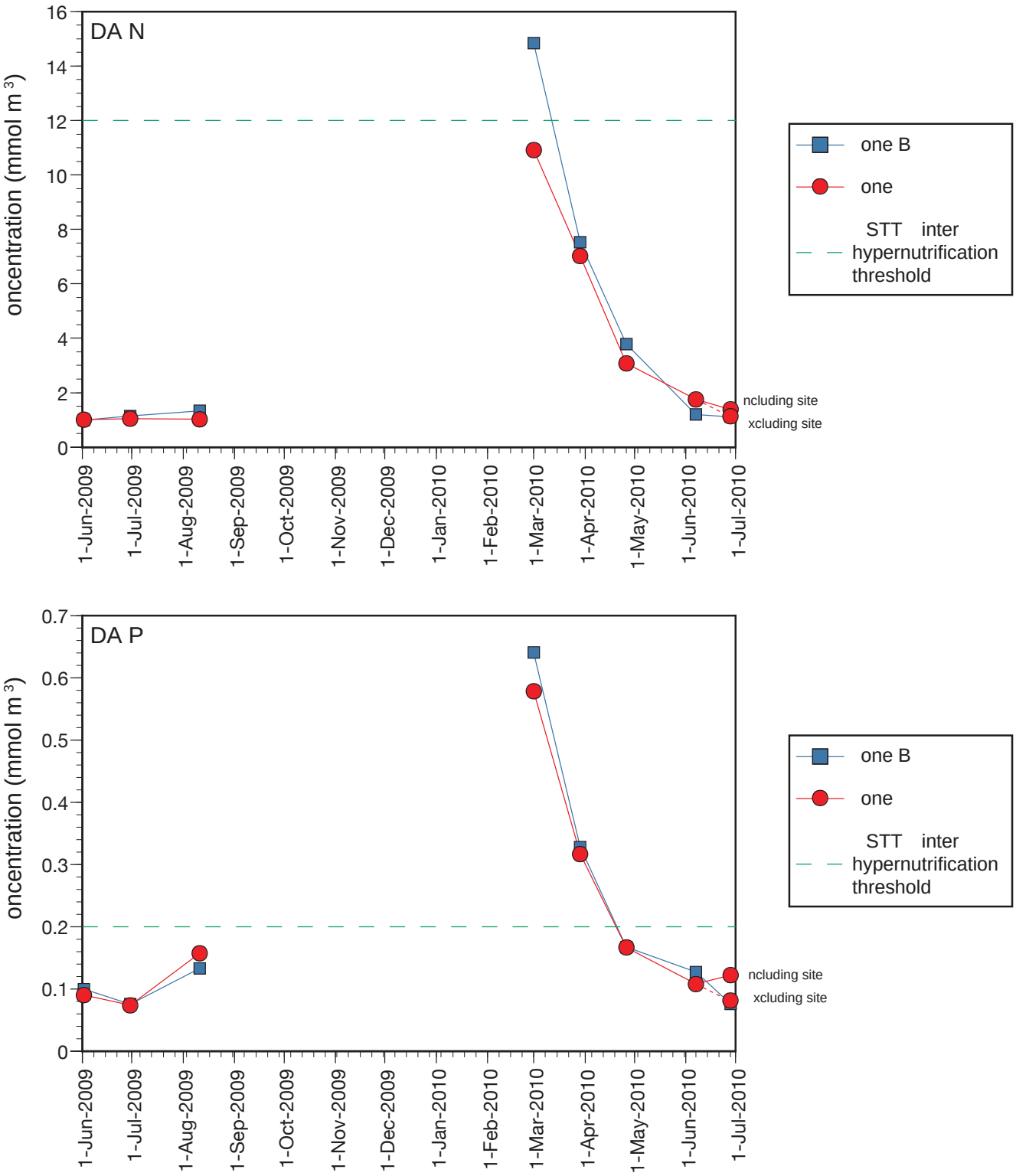


Figure 3.20 **Geometric mean dissolved available inorganic nitrogen (DAIN) and dissolved available inorganic phosphorus (DAIP) concentrations in zone B and zone C in 2009 and 2010. Two geometric mean values are shown for zone C on 28/06/10, one including and one excluding the anomalous results for site C7.**

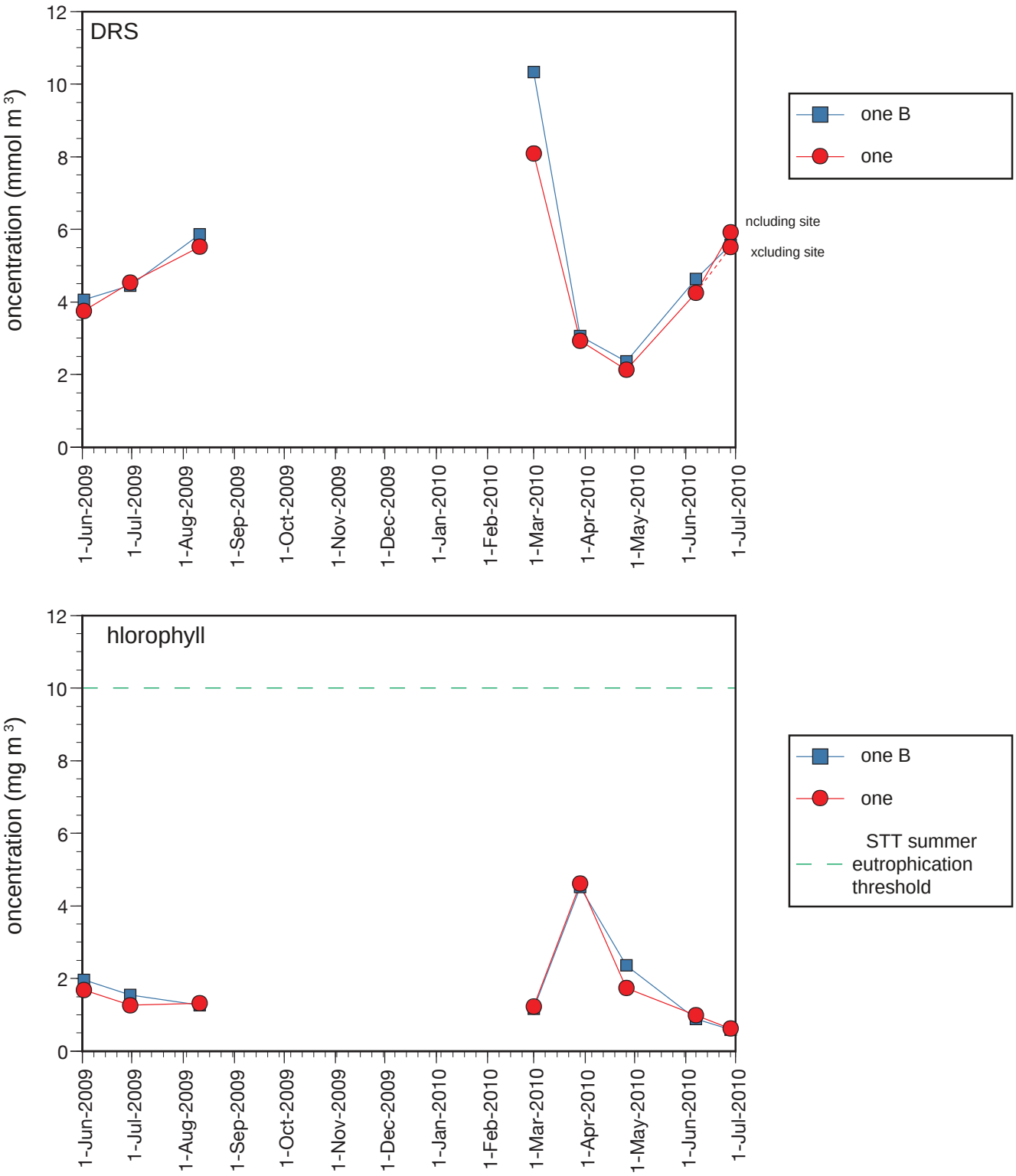


Figure 3.21 **Geometric mean dissolved reactive silicon (DRS) and chlorophyll a in zone B and zone C in 2009 and 2010. Two geometric mean values are shown for zone C DRS on 28/06/10, one including and one excluding the anomalous results for site C7.**

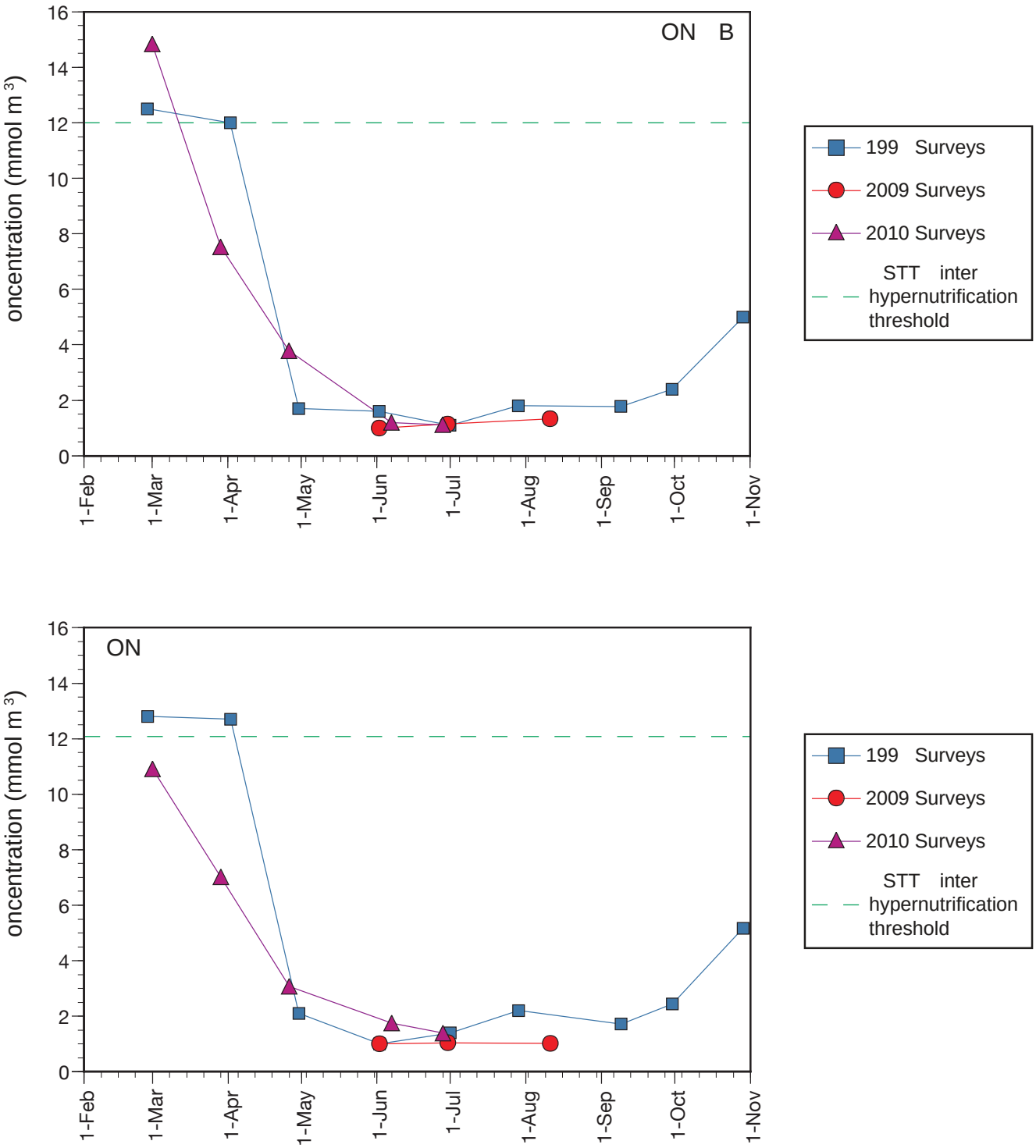


Figure 3.22 Comparison between 1997, 2009 and 2010 geometric mean dissovled available inorganic nitrogen (DAIN) concentrations in zone B and zone C.

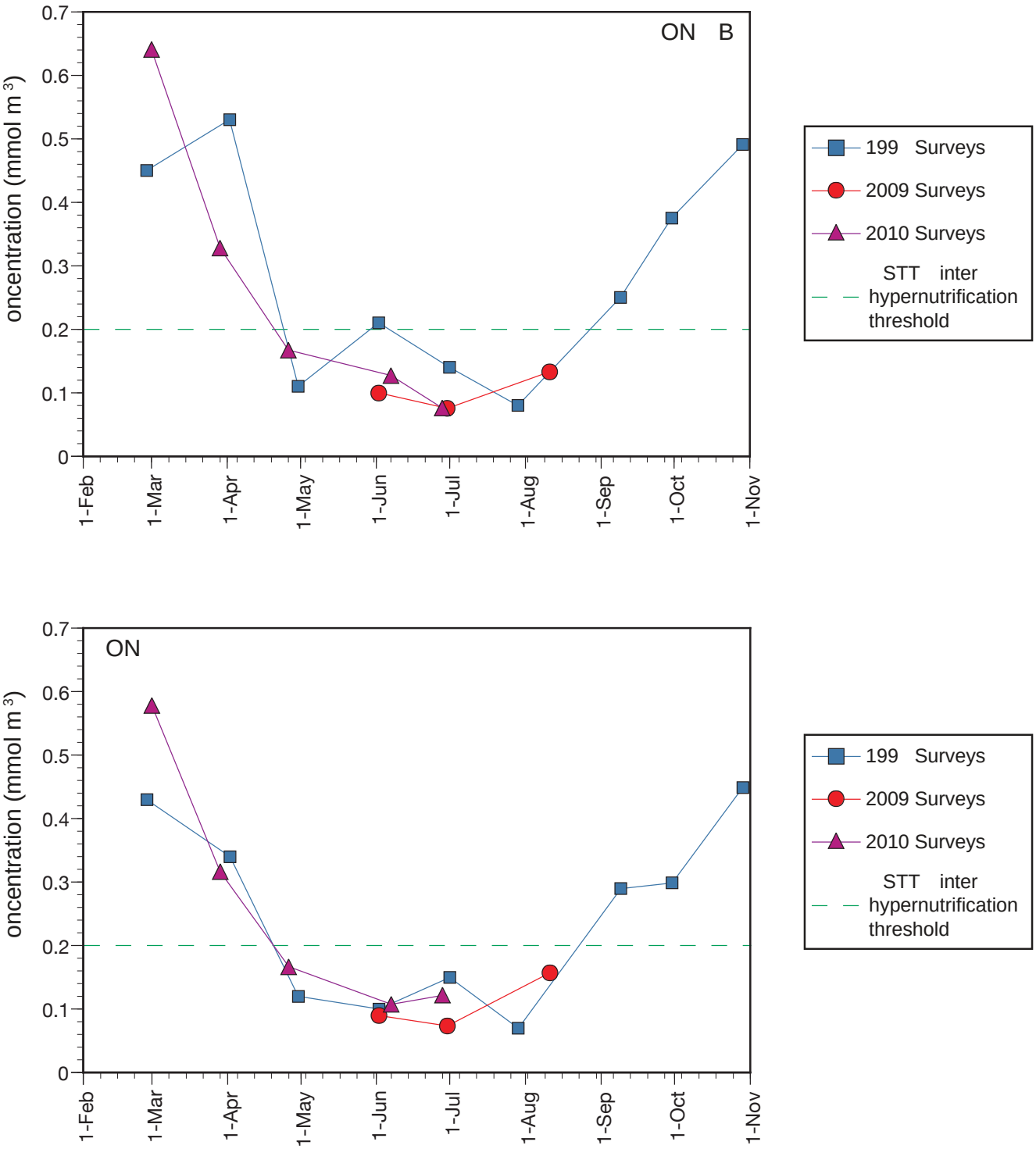


Figure 3.23 Comparison between 1997, 2009 and 2010 geometric mean dissovled available inorganic phosphorus (DAIP) concentrations in zone B and zone C.

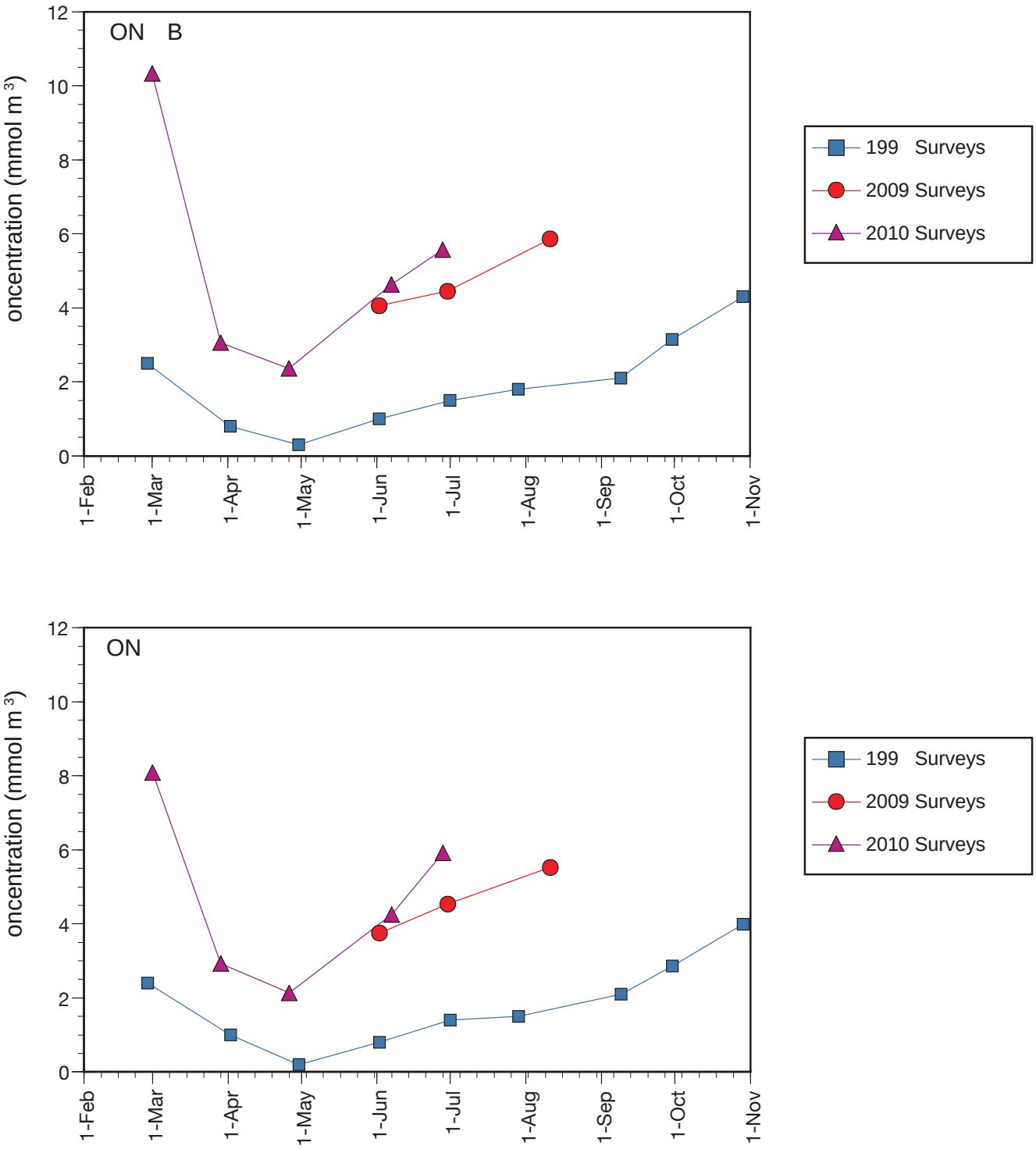


Figure 3.24 Comparison between 1997, 2009 and 2010 geometric mean dissovled reactive silicon concentrations in zone B and zone C.

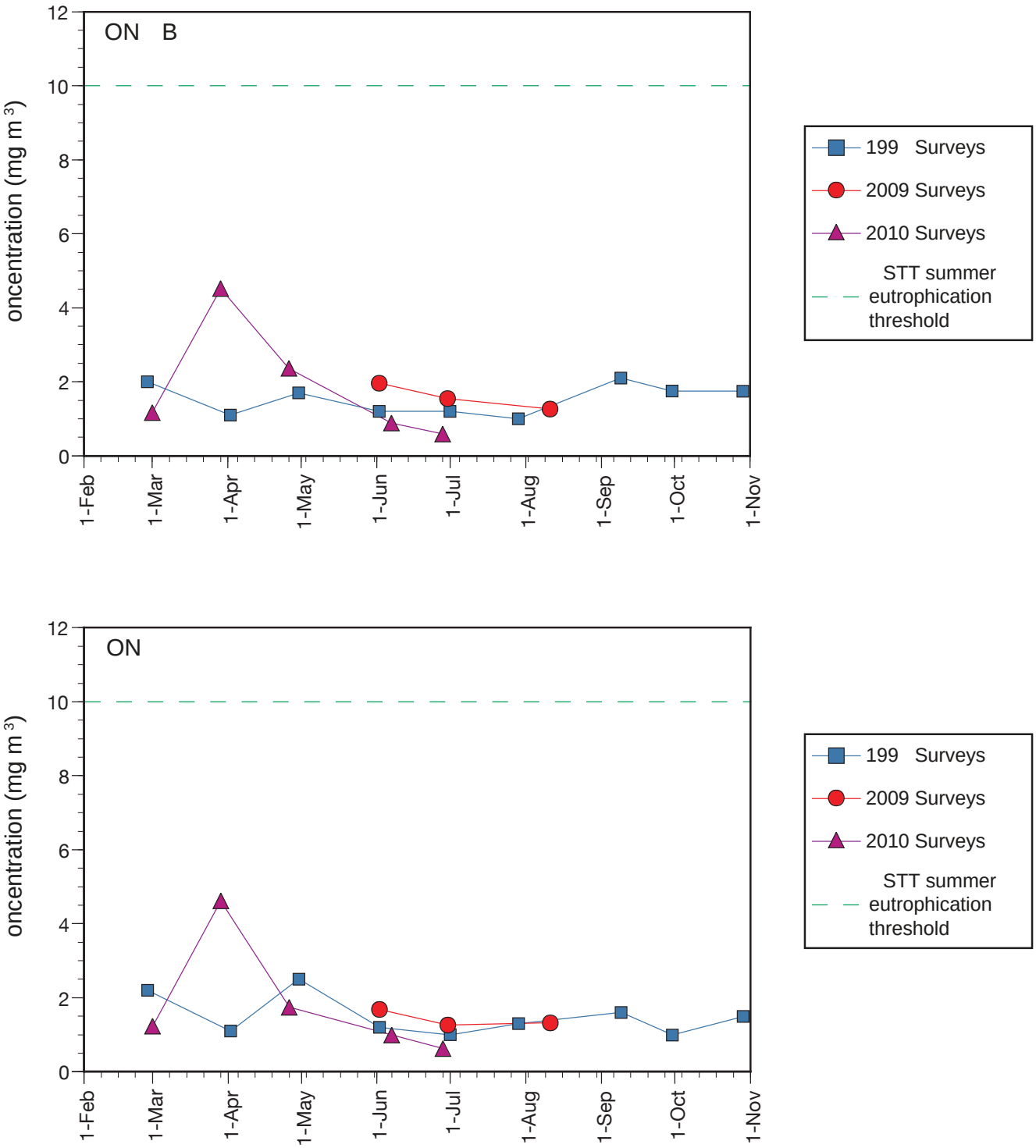


Figure 3.25 Comparison between 1997 mean, and 2009 and 2010 geometric mean chlorophyll *a* concentrations in zone B and zone C.

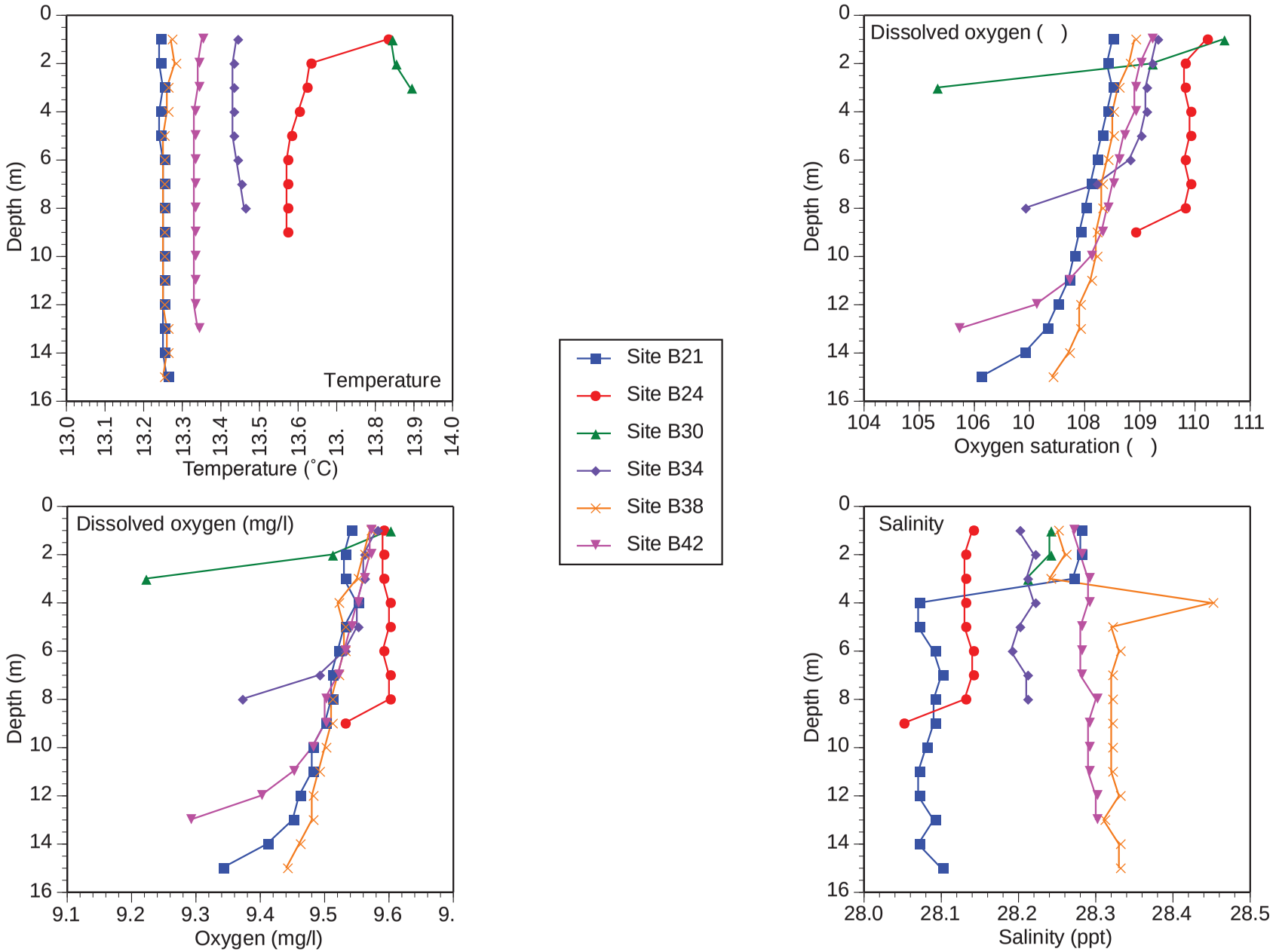


Figure 3.26a Results of sonde depth profile monitoring at sites in offshore zone B on 07/06/2010

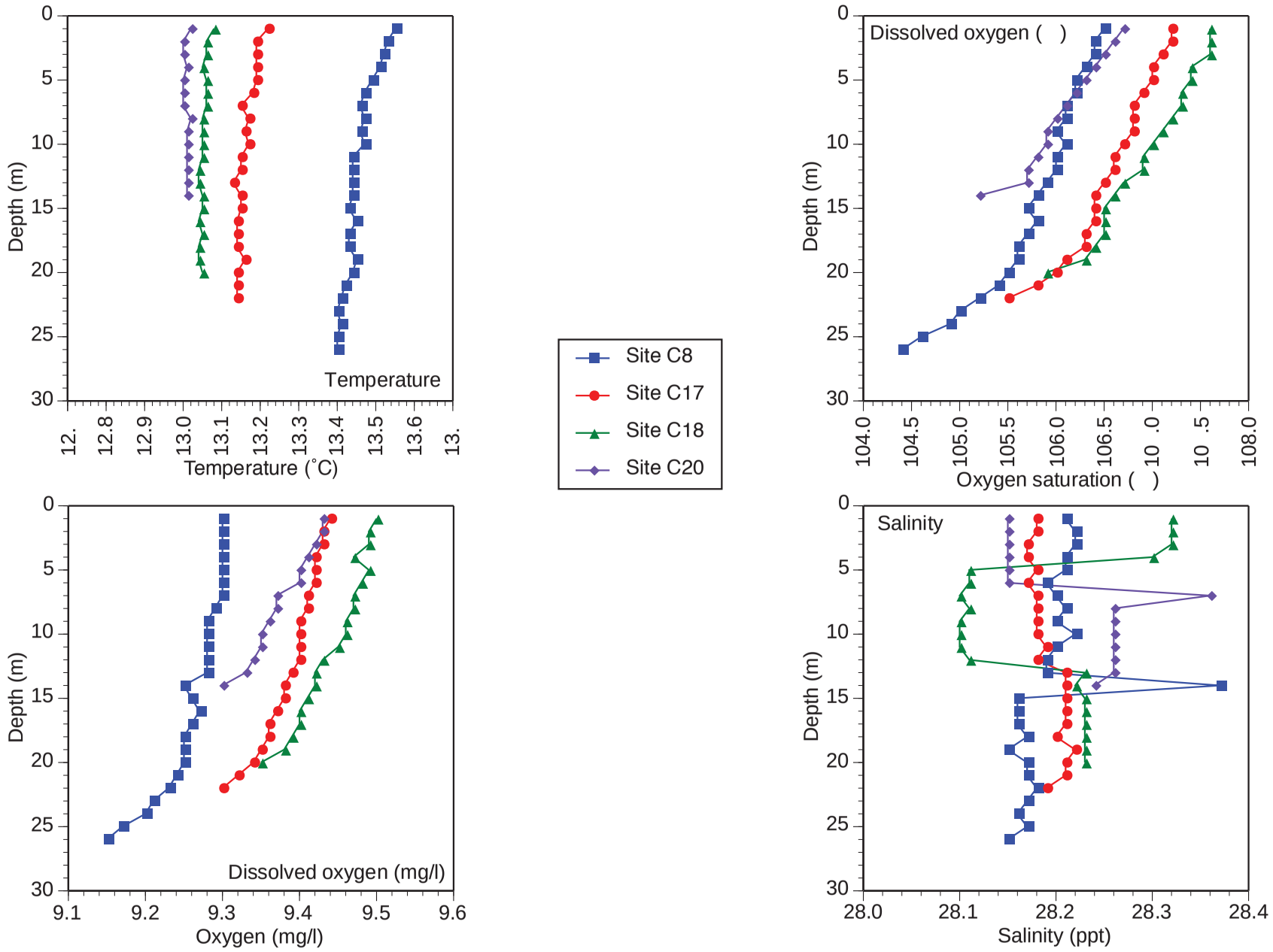


Figure 3.26b Results of sonde depth profile monitoring at sites in offshore zone C on 07/06/2010

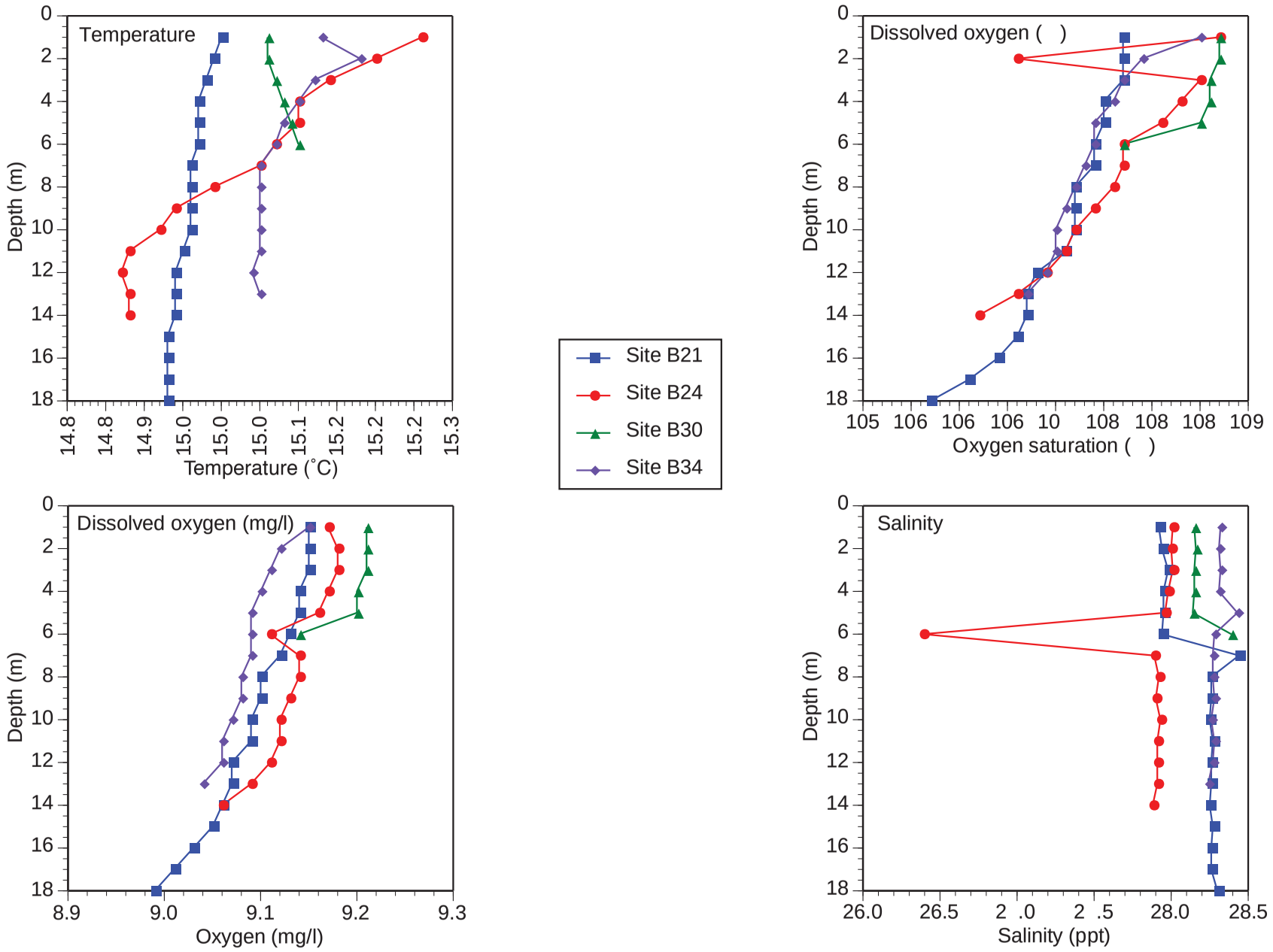


Figure 3.27a Results of sonde depth profile monitoring at sites in offshore zone B on 28/06/2010

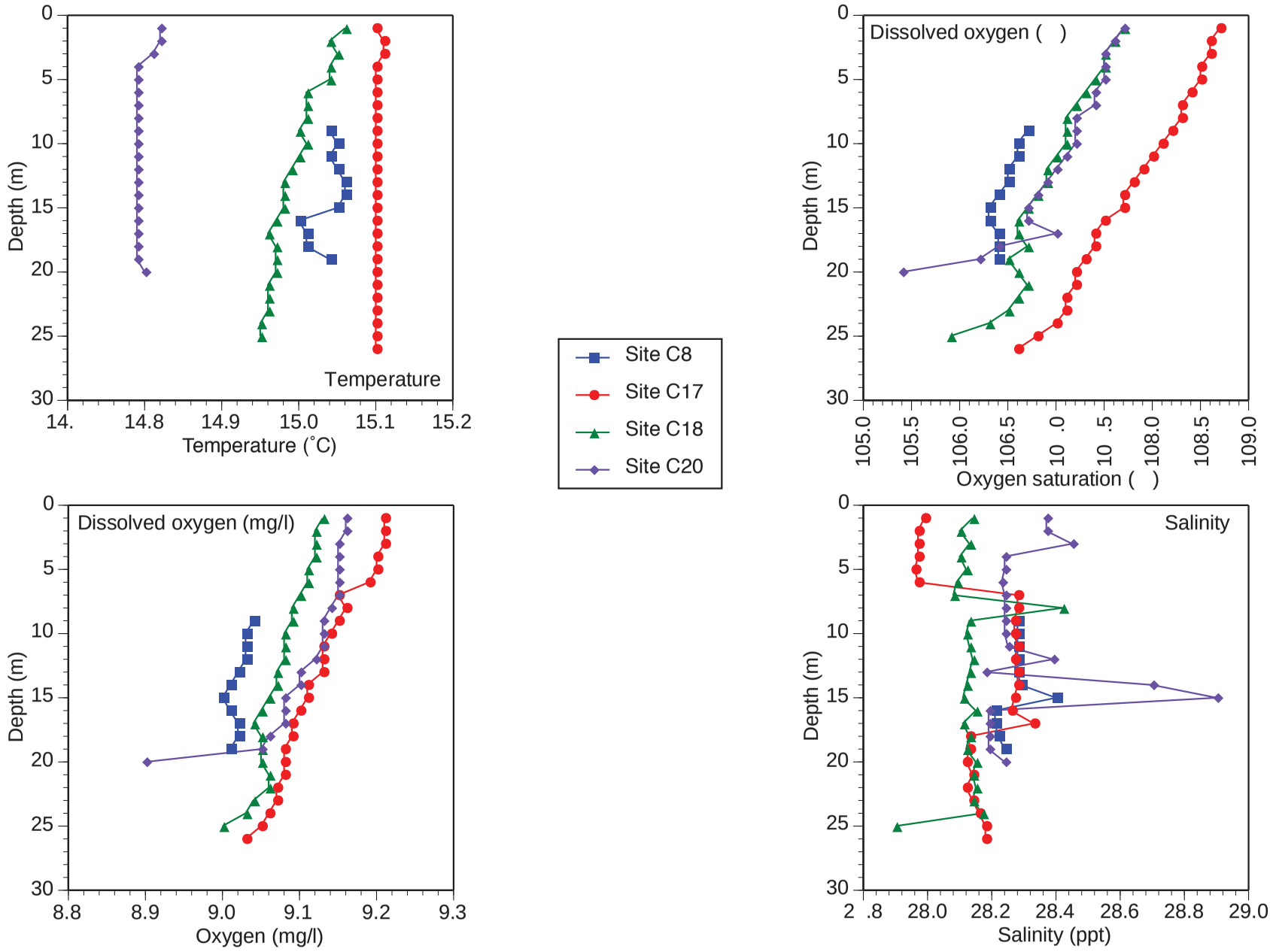


Figure 3.27b Results of sonde depth profile monitoring at sites in offshore zone C on 28/06/2010

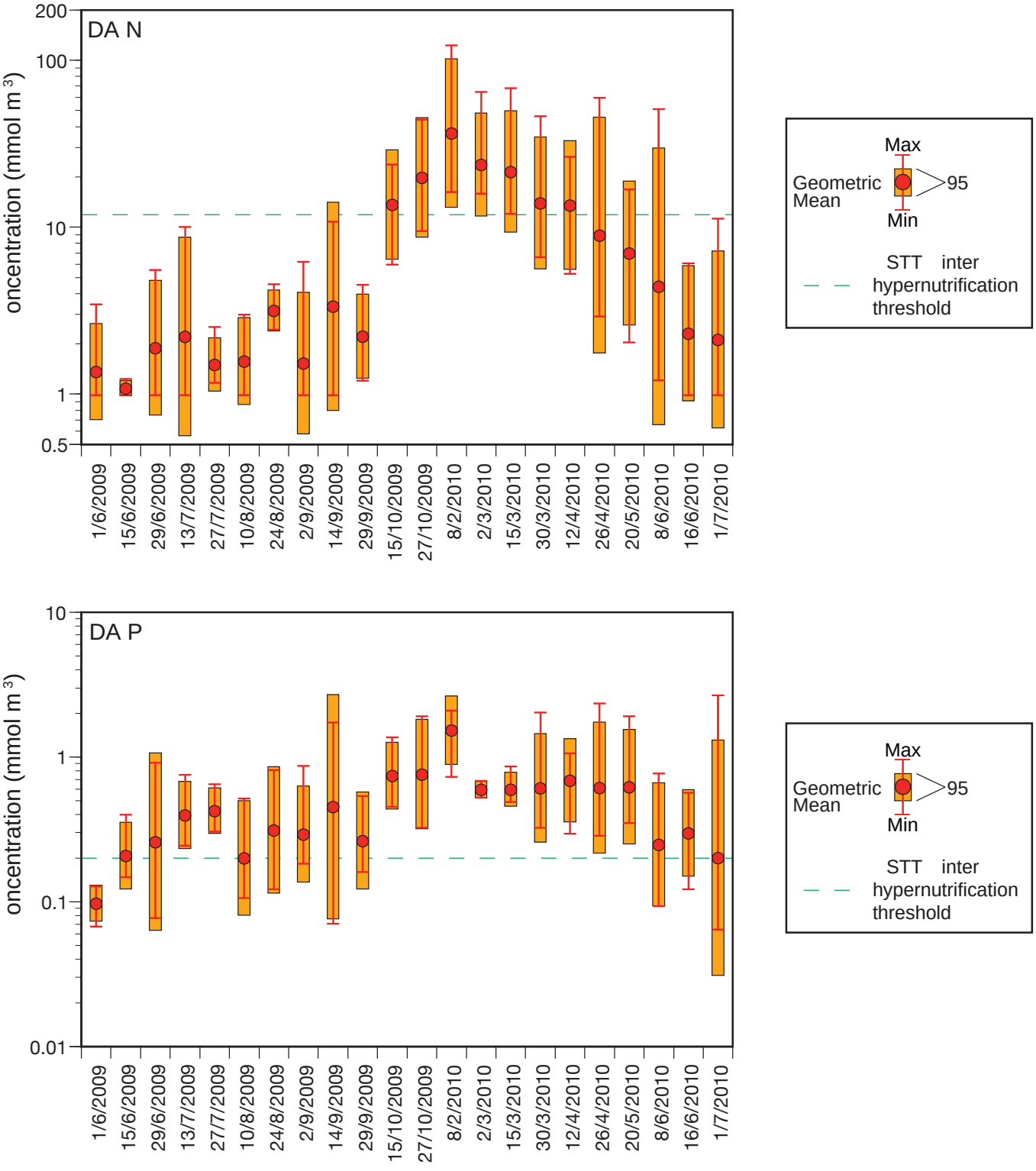


Figure 3.28 **Geometric mean, range and 95% confidence interval (CI, shaded boxes) for the mean of dissolved available inorganic nitrogen (DAIN) and dissolved available inorganic phosphorus (DAIP) concentrations in the nearshore surf zone from surveys undertaken in 2009 and 2010.**

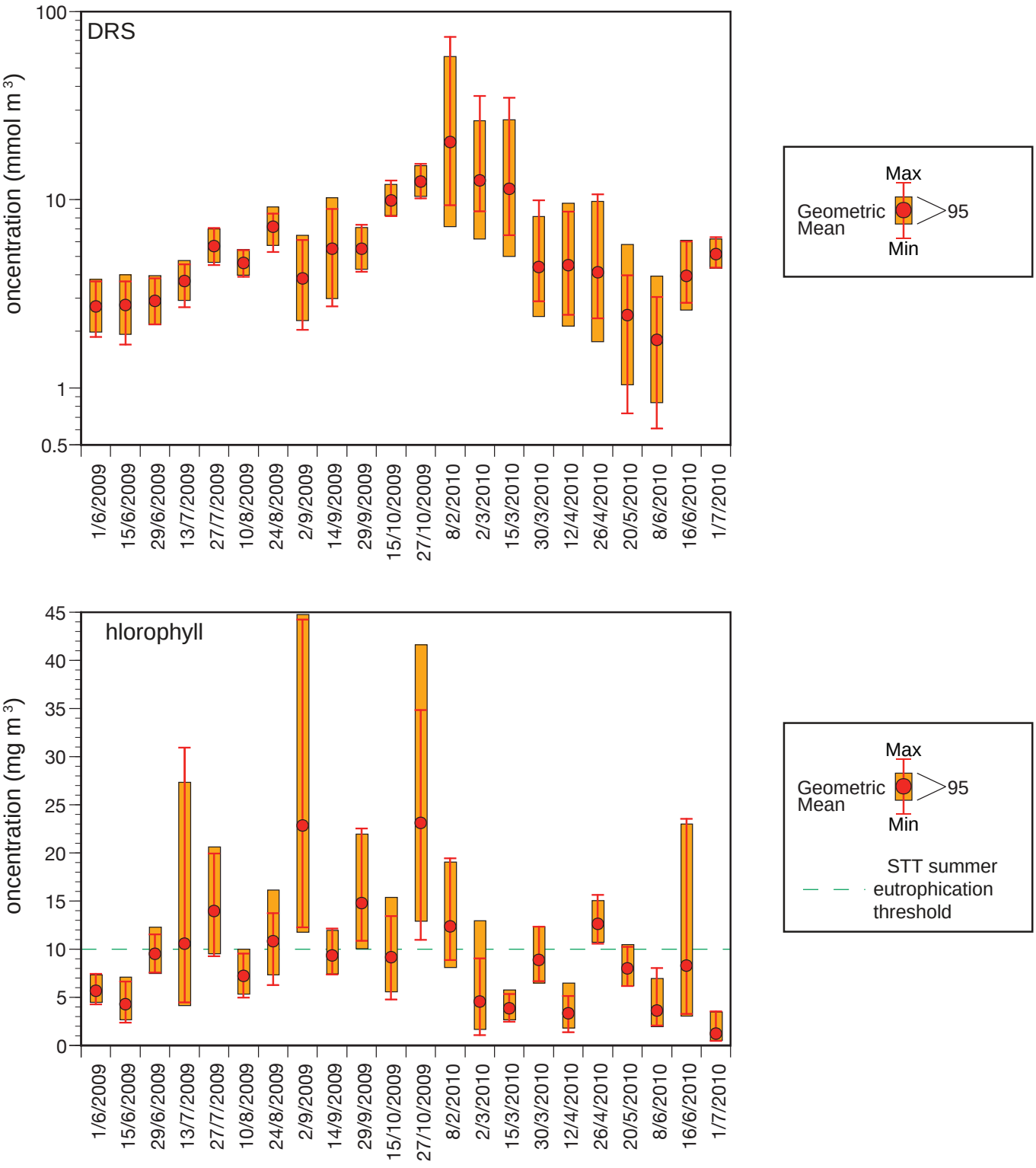


Figure 3.29 **Geometric mean, range and 95% confidence interval (CI, shaded boxes) for the mean of dissolved reactive silicon (DRS)) and chlorophyll *a* concentrations in the nearshore surf zone from surveys undertaken in 2009 and 2010.**

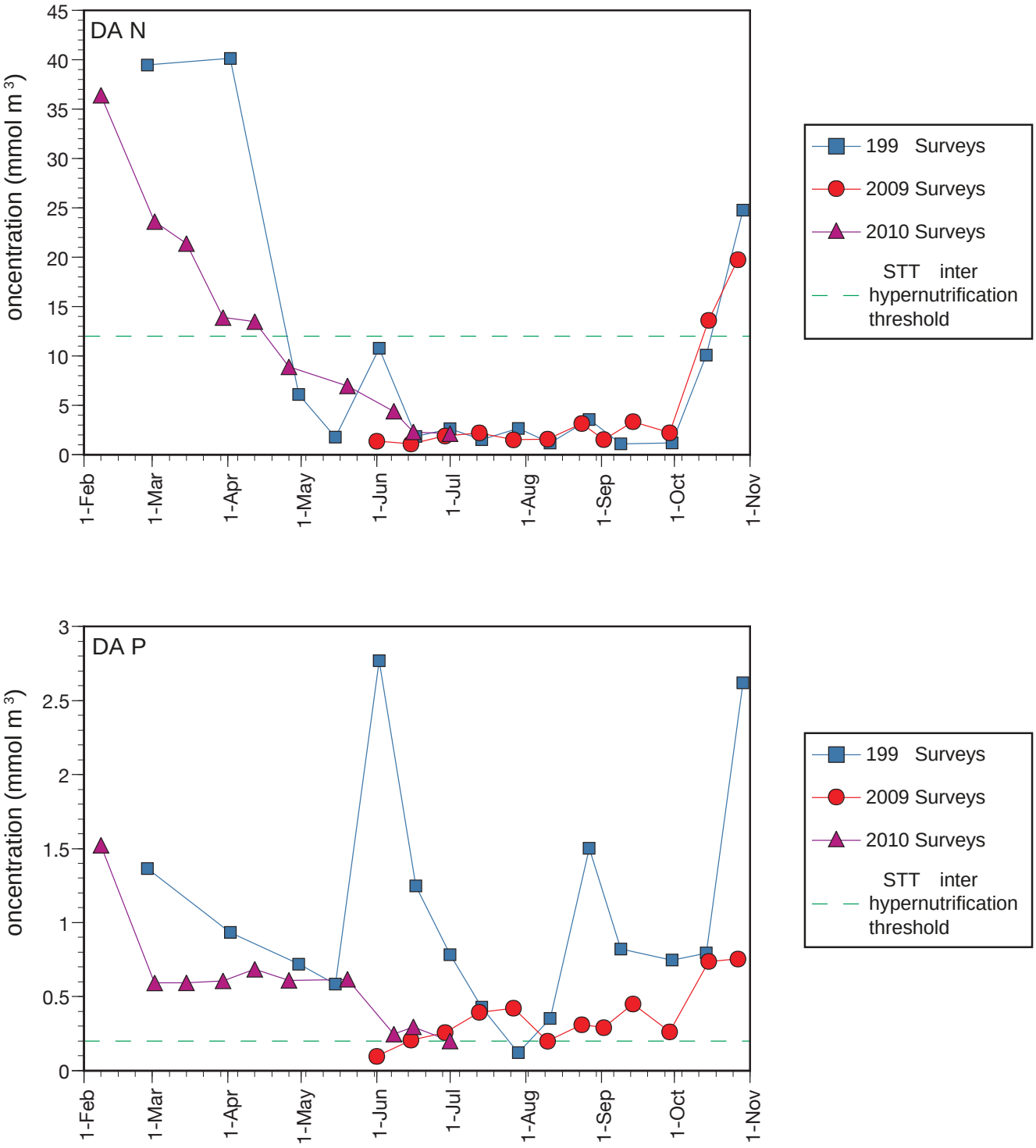


Figure 3.30 Geometric mean (2009/10 data) dissolved available inorganic nitrogen (DAIN) and dissolved available inorganic phosphorus (DAIP) concentrations in the nearshore surf zone in 1997, 2009 and 2010.

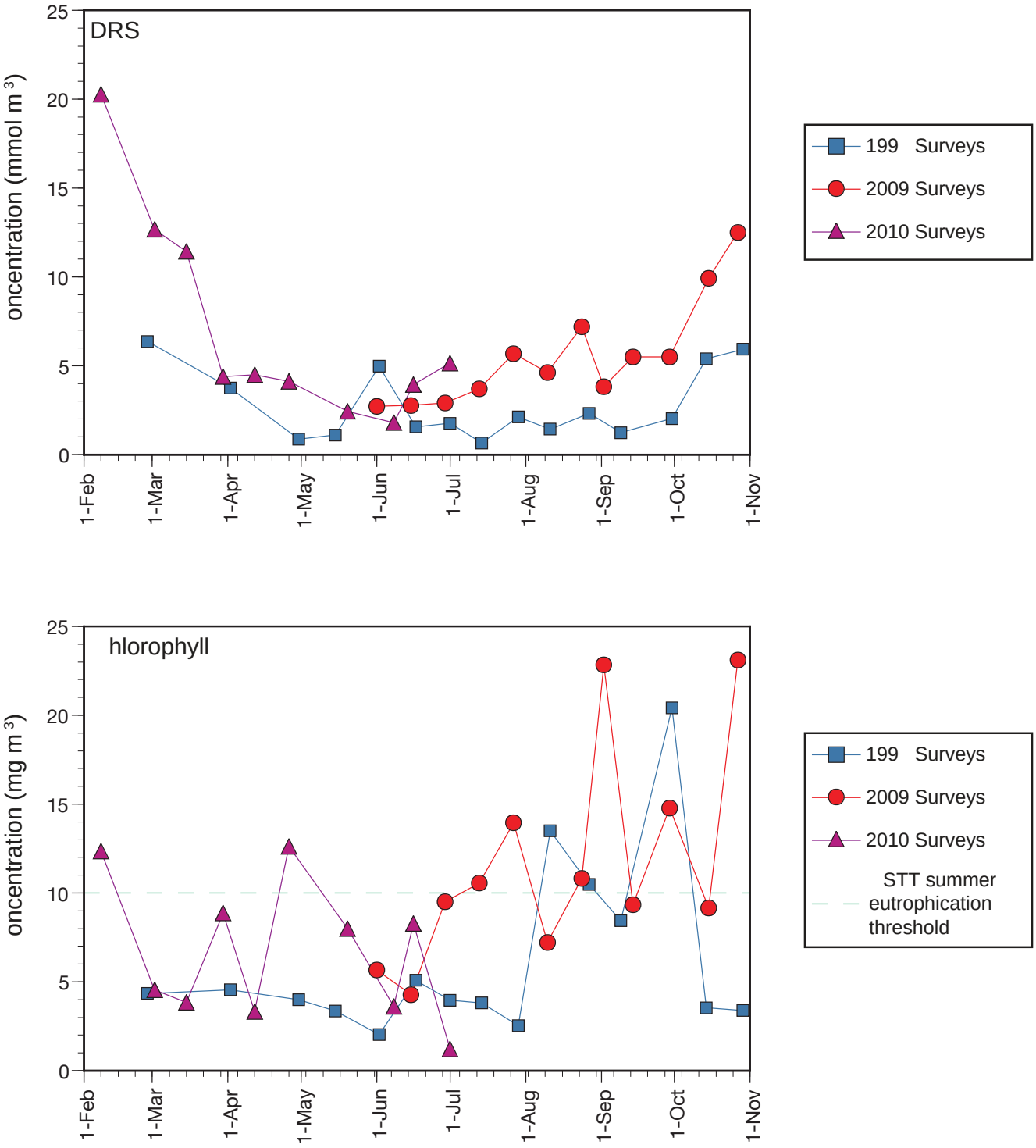


Figure 3.31 **Mean (1997 chlorophyll *a* data) and geometric mean (2009/10 data) dissolved reactive silicon and chlorophyll *a* concentrations in the nearshore surf zone in 1997, 2009 and 2010.**

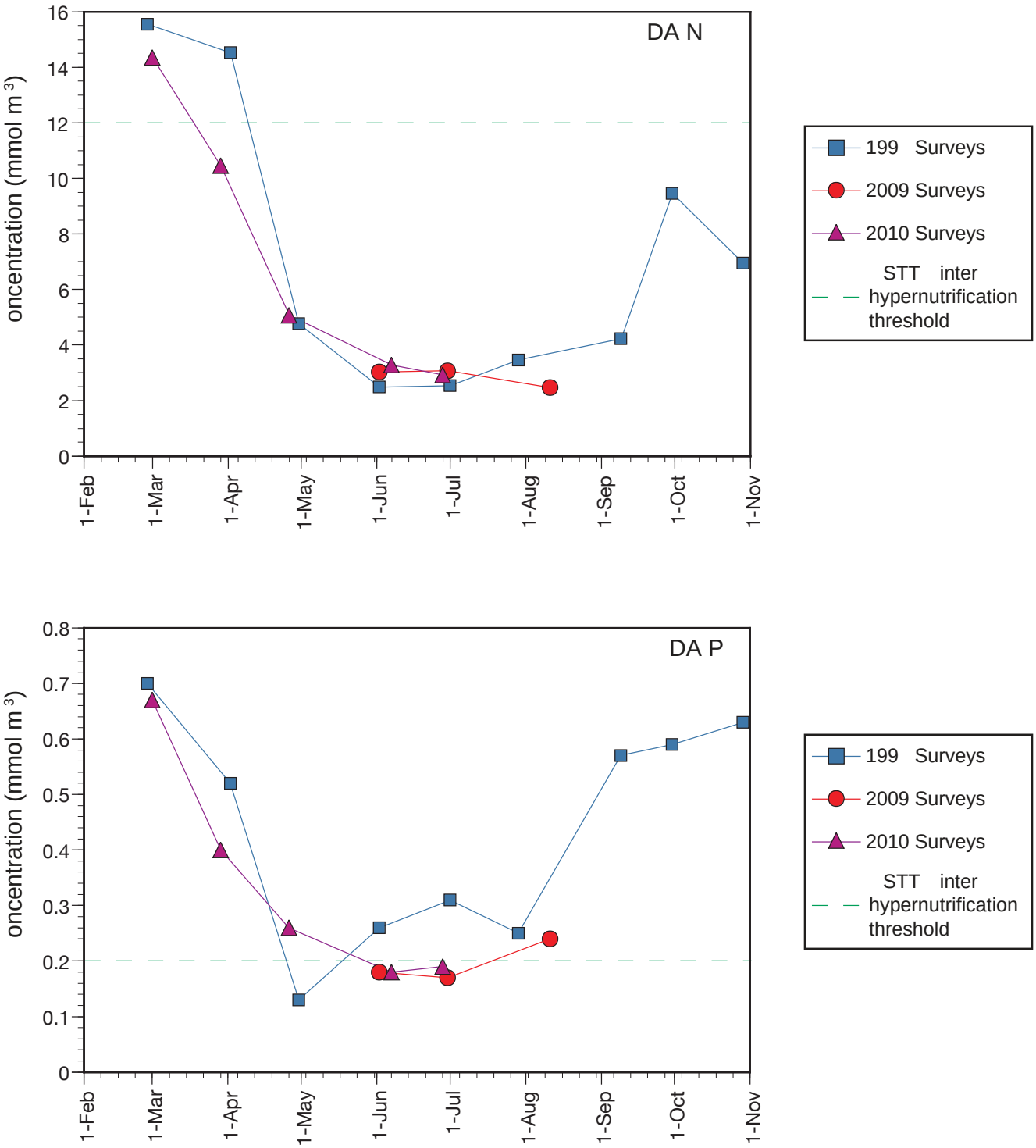


Figure 4.1 **Predicted steady-state dissolved available inorgnaic nitrogen (DAIN) and dissolved available inorganic phosphorus (DAIP) concentrations in zone B for offshore surveys undertaken in 1997, 2009 and 2010.**

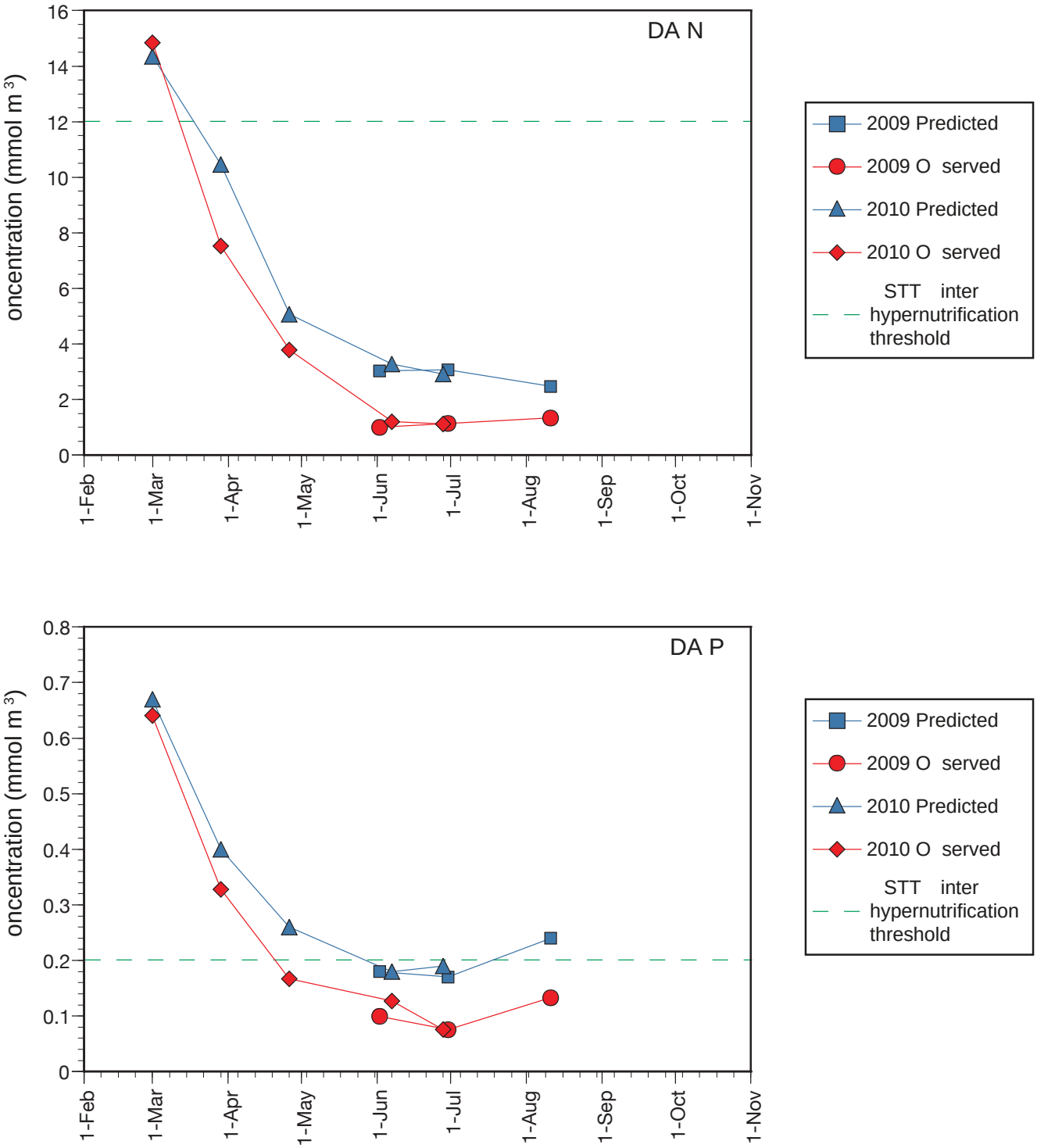


Figure 4.2 **Comparison of observed geometric mean concentrations with predicted steady-state concentrations for dissolved available inorgnaic nitrogen (DAIN) and dissolved available inorganic phosphorus (DAIP) in zone B for surveys undertaken in 2009 and 2010.**

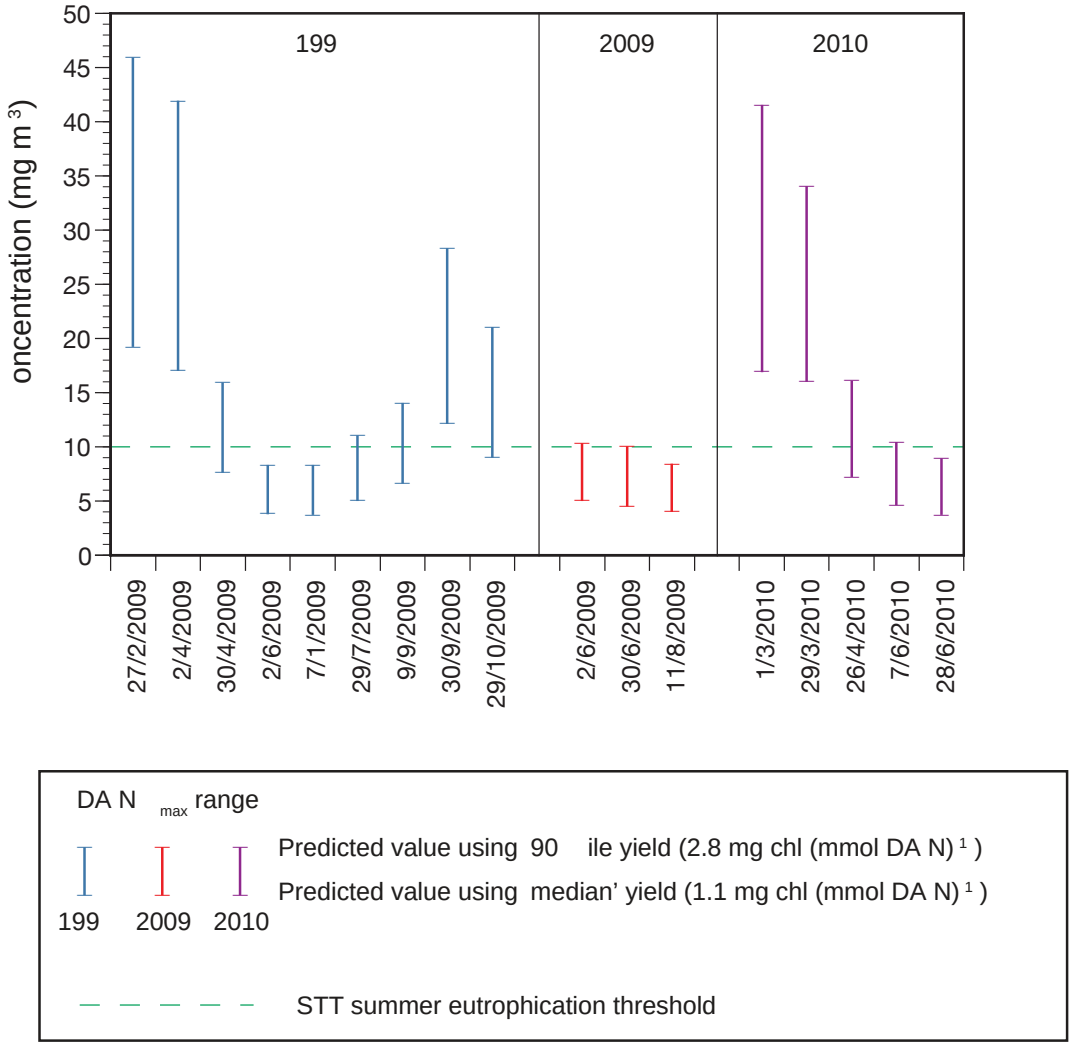


Figure 4.3 **Predicted maximum phytoplankton biomass chlorophyll *a* concentrations (X_{max}) in zone B (St. Aubin's Bay) during surveys undertaken in 1997, 2009 and 2010. The mimimum value of the range was predicted using the median yield of phytoplankton chlorophyll as recommended by CSTT (1997). The maximum value of the range was predicted using the 90 percentile yield value.**

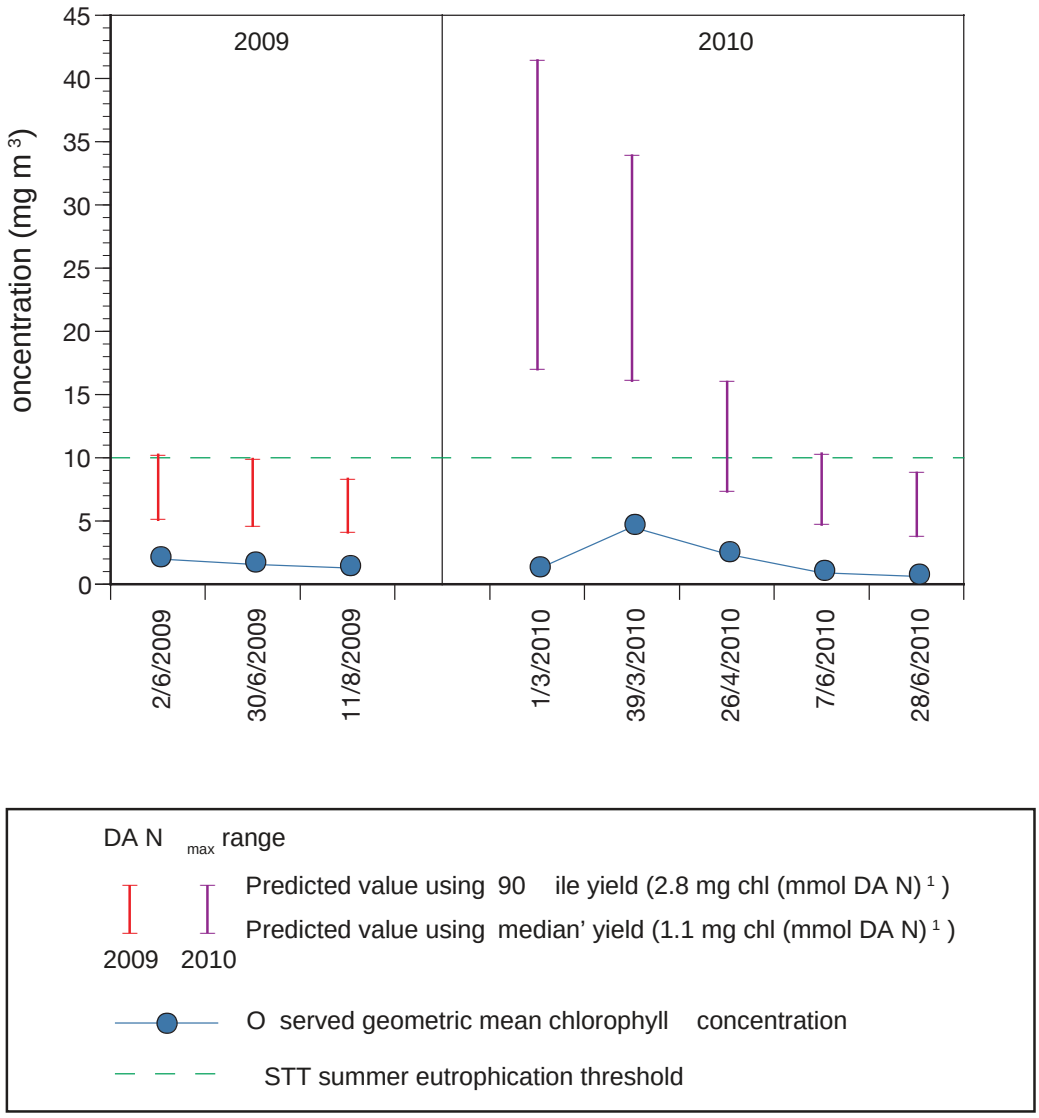


Figure 4.4 **Comparison of the range or predicted maximum phytoplankton biomass chlorophyll *a* concentrations (X_{max}) with observed geometric mean chlorophyll a concentrations in zone B (St. Aubin's Bay) during surveys undertaken in 2009 and 2010. The mimimum value of the modelled range was predicted using the median yield of phytoplankton chlorophyll as recommended by CSTT (1997). The maximum value of the range was predicted using the 90 percentile yield value.**