Marine Heat Wave Increased Variance and Decreased Productivity at Bering Strait during 2015–2016 †

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Abstract: Planktivorous auklets registered changes across two years of a marine heat wave (2015–2016). Colony attendance of crested auklets (Aethia cristatella) was reduced (35–50%) at Little Diomede I., AK in latter June 2016 compared to 2015. The pattern was similar for least auklets (A. pusilla). An anomalous marine distribution and anomalous consumption pattern were noted for crested auklets. A plot of $\delta^{15}$N/$\delta^{13}$C spanned three times the range in 2016 vs. 2015. Crested auklet RBC’s had lower $\delta^{13}$C values and higher $\delta^{15}$N in 2016. Least auklet growing primaries showed the same pattern. Advected production is important, but $\delta^{13}$C enrichment may have occurred later in 2016. Julian Date of sampling was more strongly correlated with $\delta^{13}$C of crested auklet RBCs in 2016 ($r = 0.47$, $p < 0.001$) than 2015 ($r = 0.31$, $p = 0.01$). Crested auklets had higher baseline corticosterone ($t_{0.05(2)=27} = 2.56$, $p < 0.05$) and higher variances in 2016. The crested auklet’s citrus-like odorant was less evident in 2016 and ceased earlier in the summer. Bill pigmentation was incomplete in 11% of crested auklets ($n = 82$) in 2016. Planktivorous auklets are proxies for the marine ecosystem. Increased marine heat content may have imposed additive costs that decreased productivity of some top predators.

Keywords: marine heat wave; crested auklet; stable isotopes; corticosterone; foraging ecology


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