Data compilation of respiration, feeding, and growth rates of marine pelagic organisms - DTU Orbit (09/11/2017)

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The metabolic rate of organisms may either be viewed as a basic property from which other vital rates and many ecological patterns emerge and that follows a universal allometric mass scaling law; or it may be considered a property of the organism that emerges as a result of the organism's adaptation to the environment, with consequently less universal mass scaling properties. Data on body mass, maximum ingestion and clearance rates, respiration rates and maximum growth rates of animals living in the ocean epipelagic were compiled from the literature, mainly from original papers but also from previous compilations by other authors. Data were read from tables or digitized from graphs. Only measurements made on individuals of know size, or groups of individuals of similar and known size were included. We show that clearance and respiration rates have life-form-dependent allometries that have similar scaling but different elevations, such that the mass-specific rates converge on a rather narrow size-independent range. In contrast, ingestion and growth rates follow a near-universal taxa-independent ~3/4 mass scaling power law. We argue that the declining mass-specific clearance rates with size within taxa is related to the inherent decrease in feeding efficiency of any particular feeding mode. The transitions between feeding mode and simultaneous transitions in clearance and respiration rates may then represent adaptations to the food environment and be the result of the optimization of tradeoffs that allow sufficient feeding and growth rates to balance mortality

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