

## **Animal contribution to ocean bio-geochemical processes**

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The marine ecosystem is well known to be closely coupled with atmospheric processes, and plays an important role in regulating various atmospheric compounds. One of the best examples is carbon dioxide which is an essential compound for photosynthetic process, and the relative rates of photosynthesis and respiration determines whether the ecosystem acts as a source or a sink for the atmospheric carbon dioxide (Ducklow et al., 2001). A further example of ecosystem-atmospheric coupling is production of dimethylsulfide (DMS), which may act as a climate regulatory mechanism via a feedback loop involving surface ocean temperature, phytoplankton, DMS, sulfate aerosol formation, and cloud albedo (Liss et al., 1997). As such, understanding ecosystem processes is fundamental to understanding marine bio-geochemical processes, and hence coupling with the atmosphere.

In marine bio-geochemical studies the major research effort have focussed on smaller organisms at the base of the ecosystem (i.e. microbes, primary producers). There is growing evidences in the literature are to suggest that role of larger animals in structuring marine ecosystem has been greatly underestimated (Nicol et al., 2010). In the past the processes of nutrient cycling has largely been explained by physical forces (e.g. upwelling, vertical mixing due to wind), but recent studies suggest turbulence caused by vertically migrating animals can significantly mix in water column (Dewar et al., 2006). It has also been suggested that krill and whales may act as significant reservoirs of iron in the pelagic system and may be important in recycling limiting nutrients (Nicol et al., 2010). Fish have been suggested to play important role in calcium carbonate cycle in the ocean (Wilson et al., 2009). These factors/processes were not accounted for in the past.

The marine ecosystem is now facing the threat of climate change. Without having a good understanding of the processes involved across various levels of the ecosystem, it is impossible to predict how the climate change may impact the marine ecosystem structure. There may be a need for a new look of the marine bio-geochemical cycle in this regard.

### **References**

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