Factors contributing to the formation of oil containing marine snow

Nutrients, Clays, Riverine Influences, Salinity, Petrogenic, Dispersant, Pyrogenic

Marine snow

Microbial loop, Transport to depth, Mesozooplankton food

I do not really understand the lower triangle?

GoMRI Funded Working Group: MOSSFA
Marine Biota: Importance of snow

Marine snow provides microhabitats (hot spots) for bacteria and protozoa with high turnover rates.

Active microbial loop

Marine snow provides food for large invertebrates and fish – entrance into the food web!

Mesozooplankton food

Effective transport to depth

Marine snow sinks at velocities high enough to transport ingredients to great depths.

Marine snow

Concentrated substrate

Large size

high sinking velocities
Riverine Influences

- oligotrophic to eutrophic
- determines which biomass (diatoms vs. cyanobacteria)

Nutrients

- clay particles provide ballast for marine snow
- clay type governs particle adsorption (charge and size)

Clays

Marine snow

Type of biomass

Ballast

Inorganic processes

Salinity

- settling rates
- mixing stratification
- "salting out"
Oil and Dispersant

Oil Type:
1. Lacustrine (algae)
2. Marine (mixed source)
3. Terrestrial

Subsurface and surface release

- Petrogenic
- Dispersant
- Marine snow
- Pyrogenic

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Why is Marine Snow Important?

1. Exporting toxic components (petroleum/dispersants)
2. Exporting a large volume/mass
3. Exporting highly degradable material to seafloor (avoiding microbial degradation in water column)

4. Transport to depths (all your export ones are subheadings to this)
5. As food for organisms that need larger particles
6. As hotspots for microbial activity (density of bacteria and enzymes)
Environmental, Chemical and Biological Gradients

River Influence - Proximal
- High nutrients, clays, DIC/N/P, low ‰, Wet season
- Flood climate regime
- Diatoms (Nitrate excess)

River Influence - Distal
- Low nutrients, clays, DIC/N/P, high ‰, Dry Season
- Drought climate regime
- Cyanobacteria (N2 fixation)

-Larger Grain Size
- Lithic/Organic
- Shallow Redoxcline
- High POC Flux
- High Foram O2 Tolerance

-Smaller Grain Size
- Carbonate
- Deep Redoxcline
- Low POC Flux
- Low Foram O2 Tolerance

-Different types of oil containing marine snow form at the surface and in the subsurface plume (TEP &EPS)
-Microbial modification & degradation on sinking snow
-Feeding on sinking snow
-Sediment accumulation of floc and resuspension

-Decrease in grain size
-Clay mineral/lithology shift
-Petroleum byproduct toxicity
-Shoaling redox-cline with higher POC flux
-Benthic Foram O2 tolerance
Group 1: Processes and pathways
- Distribution of oil in surface and subsurface waters.
- Distribution of chl. a in surface and subsurface waters.
- Distribution & type of minerals in surface and subsurface waters.
- Distribution of dispersants in surface and subsurface waters.
- Marine snow distribution
- Marine snow formation processes
- Marine snow loss processes
- Phytoplankton type
- Marine snow sinking velocities

Group 2: Accumulation rates and Fate
- Sedimentation signal in traps
- Accumulation Rate signal in sediments
- Changes in SLR profiles (Th-234, Pb-210)
- Sedimentary constituent/grain size signal
- Redox metal chemistry
- PAH concentration/toxicity
- Carbon source (petro/pyro/bio)
- OM transformation pathways
- Spatial/water-depth distribution of marine snow in sediments
- Spatial Survey of biological inputs

Kendra Daly, Uta Passow, Vernon Asper, Ian, Joe Montoya, Kai Ziervogel or Carol Arnosti, Tinka Murk

Group 3: Effects
- Effects on Microbial community in water and sediments
- Effects on benthic macrofauna
- Effects on pelagic food webs
- Petrol degrading bacteria
- Effects on benthic forams
- Export, NPZ and and ecosystem modeling

Andreas Teske or Carol Arnosti, Jeff Chanton, Monty Graham (food webs), White at al. (Corals), Patrick Schwing (forams), Joel Kostka, Cam Answorth, John Walsh, Claire Paris,

Hi Uta,
Please excuse my late application to the MOSSFA group. I've just filled out the form online. I've