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Title: *Multidisciplinary drifting Observatory for the Study of Arctic Climate - MOSAiC*

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The Arctic climate is changing fast but the scientific understanding of the origin of these changes is poor. Detailed and comprehensive measurements covering at least an annual cycle and extending from the atmosphere through the sea-ice and into the ocean over the central Arctic Ocean are needed to provide a process-level understanding of the coupled Arctic climate system. Such measurements are necessary for the improved modelling and predictions of Arctic weather and climate conditions. To obtain these observations a manned drifting ice floe station will be installed in the young sea-ice of the far western Arctic and follow the evolution of the ice pack during the transpolar drift towards the Fram Strait region. Multidisciplinary observations will target the processes that transfer energy, mass and momentum trough the atmosphere-ice-ocean-ecosystem. The centerpiece of the multidisciplinary drifting observatory will be an icebreaker-based station that will serve as hub for comprehensive observations. After start in autumn 2018 the following science questions. will be targeted.

1. How do ongoing changes in the Arctic sea ice-ocean-atmosphere system drive heat and mass transfers of importance to climate and ecosystems?

2. What are the processes and feedbacks affecting sea ice cover, atmosphere-ocean stratification and energy budget in the Arctic?

3. Will an ice reduced Arctic becommes biologically more productive and what are the consequences for other components of the system?

4. How do different scales of heterogeneity within the atmosphere, ice and the ocean interact to impact the linkages and feedbacks within the system?

5. How do interfacial exchange rates, biology and chemistry couple to regulate the major elemental cycles?

The MOSAiC observations will serve as a testbed for evaluation and improvement of regional and global weather forecast and climate models.