Physical Sea Ice Properties in the Winter Weddell Sea in 2013

Polarstern Antarctic Winter Experiment 2013

AWECS  Antarctic Winter Ecosystem & Climate Study 08. June – 12. August 2013


Observation of physical sea ice properties
In-situ / Airborne / Autonomous
• Up-scaling of observations with satellite remote-sensing data
• Seasonal variability of sea ice and snow
• Long-term variability and trends

Airborne EM sea-ice-thickness surveys

MAISIE (Multi-Frequency Airborne Sea Ice Explorer)
Airborne EM sea ice thickness
Nadir Aerial Imagery (UAV platform)

GEM-2 (Geophex Ltd.)
5 Frequencies
(1530, 5310, 18330, 63030, 93090 Hz)
Bluetooth communication interface
Joint snow depth and GEM-2 ice thickness
(drilling, estimation of voids, surface elevation)

ASPECT sea ice observations

Data over more than 30 years
• Seasonal variability
• Partially long-term changes
• Climatology

Observed properties:
• Sea ice concentration
• Ice type
• Sea ice thickness and snow depth
• Floe size and topography
• Meteorological conditions

461 observations over 53 days (AWECS)
• Total sea ice concentration: 87.79 %
• Averaged level ice thickness: 54.25 cm
• Averaged ridged ice thickness: 94.5 cm
• Averaged snow depth: 20.73 cm

1992 vs. 2013

Snow & Ice Cores

Snow pit stratigraphy
87 snow pits
Mean snow depth: 29.5 cm

Ice coring with optical measurements at 16 sampling sites
Thickness range: 34 – 160 cm

Buoy Deployments

Ice mass balance / snow-depth / GPS drifters

buoy positions (27.02.2014)