were made to locate and identify convective precursors of severe weather due to lake breeze boundary interactions with the X-band radar. As a diagnostic and prognostic observation and analysis tool, the X-band was able to make contributions to the research from the perspective of scanning flexibility. In comparison, the more sensitive C-band operational radar performed far better as a means of detecting boundary interactions well in advance of severe weather, making it a more effective research tool. The boundary interactions on June 19, July 19, and July 23 of 2001, are presented as case studies to illustrate the performance strengths of each radar.

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Estimating Active Layer Thaw Rates in the Kuparuk River Basin, Alaska, with NOAA AVHRR-Derived Surface Temperature Time Series

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Recent developments in the field of remote sensing, and in particular the availability of long time series of NOAA AVHRR data, have led to an increase in the application of satellite imagery for environmental monitoring. In this paper, we demonstrate the potential of AVHRR 10-day composite brightness temperature time series for monitoring active layer thaw rates in summer. Our primary intent was to examine if the satellite-derived surface temperatures followed the same general temporal trajectories as the air/ground temperature measurements during the course of summer. AVHRR-derived surface temperature values are first compared to mean air temperature and mean near-surface ground temperature measurements from permafrost sites. Accumulated degree-days of thaw (ADDT) are then calculated from the AVHRR surface brightness temperature 10-day composite data set through interpolation between 10-day intervals and summed over the period of interest. Lastly, the AVHRR-derived ADDTs are assimilated into thawing indices calculated from near-surface ground temperature and active layer thaw depths at several sites within the Kuparuk River basin. Results show that the composite summer temperature curves and sums of degree-days derived from AVHRR are adequate matches with the near-surface temperature curves of several sites. The best relationships between satellite-derived ADDT and thaw depth are generally found in areas of low vegetation density and low relief since effects due to the presence of a canopy and/or topography (slope/aspect) are minimised.

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Approach to quantitative risk analysis of land use in permafrost areas

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Probability of changes of climate and landscapes in permafrost areas are the subject of increased interest due to the global warming and human impact on the environment. The long-distance transportation of oil and gas expose the environment of permafrost areas to the risk of underground and surface water contamination. Modern activity of dangerous surface processes in the North affects roads, pipelines, and buildings. The Geographic Information Systems (GIS) now enable to gather a variety of information and adopt simulation technologies. Our research project is focused on the studies of permafrost disturbance and includes the use of analysis and interpretation of remotely sensed multispectral imagery. A database collection and advanced distributed simulation

are expected to estimate the risks of pipeline failures and other construction damages in permafrost areas due to geocryological processes. The analysis of satellite imagery and aerial photos is used for digital landscape mapping. In order to calculate major permafrost parameters - temperature of soil and active layer depth - geological and meteorological characteristics of landscapes (air temperature, thermal conductivity of snow, soil, etc.) are considered according to the recently established and approved technique. As the result of the first stage, a digital permafrost map is made for the Central Siberia region. In the second stage, the probabilities of microclimate change and surface disturbance are calculated. Natural fluctuations of meteorological parameters and probability of human impact are estimated for the calculations. Then the probabilities of permafrost disturbance and consequent impact on construction are obtained for various landscape conditions.

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Le recul récent du glacier C-79 sur l'île Bylot, archipel arctique canadien

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L'île Bylot est située dans l'Arctique canadien, au nord de l'île de Baffin. De nombreux glaciers prennent naissance dans les montagnes de la Cordillère arctique qui traverse l'île en son centre. Ceux-ci s'écoulent sous forme de grandes langues lobées vers les basses terres en contrebas. La majorité des glaciers sont présentement en régression. En particulier, nous avons documenté le recul du glacier C-79. Au cours de l'été 2001, nous avons cartographié précisément la position actuelle du front glaciaire grâce à une série de mesures au GPS. Son recul par rapport à sa moraine frontale néoglaciaire, ainsi que des taux de recul ont pu être mesurés précisément. De plus, sa position actuelle a été comparée avec celles d'années antérieures, observables sur des photos aériennes (1958 et 1982) et des images satellitaires (1990). De nombreuses formes glaciaires apparaissent au front du glacier : moraine médiane, moraine frontale, moraine à cœur de glace... Plusieurs formes fluvioglaciaires actives témoignent de la fonte du glacier : tunnels, flancs de glace, bédières, lac proglaciaire, chenaux anastamosés. De toute évidence, le front glaciaire couvert de débris morainiques s'est abaissé récemment. Cette analyse indique un recul marqué du glacier C-79 depuis les 50 dernières, et particulièrement au cours des 20 dernières années. Ce retrait semble lié au réchauffement climatique régional. Mots-clés : géographie physique, géomorphologie glaciaire, fluvioglaciaire, recul glaciaire, cartographie, réchauffement climatique

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Winter sources of mixing in the Gulf of St. Lawrence

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The fall and winter processes of water mass and sea-ice formation and circulation in the Gulf of St. Lawrence are examined using a three-dimensional coastal ocean model with realistic tidal, atmospheric, hydrologic, and oceanic forcing. The ocean model includes a level 2.5 turbulent kinetic energy model. A model simulation over 1996-97 is verified against available data on sea ice, temperature, and salinity. The results demonstrate consistent atmosphere-ocean exchanges and the known features of the circulation and sea ice cover. The mixed layer deepens to more than 100 m depth as seen both in the data and in the model results. The production of turbulent kinetic energy and the associated vertical mixing are examined as functions of shear (from the winds, tides, and internal waves), surface buoyancy loss from advection and air-sea exchanges, and