

**CURRICULUM VITAE
THOMAS C. GRENFELL**

PERSONAL DATA

Address and Telephone: Dept. of Atmospheric Sciences, AK-40
University of Washington
Seattle, Washington 98195
(206) 543-9411

Title: Research Professor

EDUCATION

Sc.B. Brown University, Providence, RI, 1965
M.S. University of Chicago, Chicago, IL, 1968
Ph.D. University of Washington, Seattle, WA, 1972

POSITIONS HELD

1991-Present Research Professor, Department of Atmospheric Sciences, University of Washington, Seattle, WA
1992-Present Adjunct Principal Research Scientist, University of Washington Applied Physics Laboratory
1985-1991 Senior Research Associate, Department of Atmospheric Sciences, University of Washington, Seattle, WA
1973-1985 Research Associate, Department of Atmospheric Sciences, University of Washington, Seattle, WA
1971-1972 Lecturer, Department of Astronomy, University of Washington, Seattle, WA
1968-1970 Teaching Assistant, Department of Astronomy, University of Washington, Seattle, WA

PROFESSIONAL AFFILIATIONS

Adjunct Principal Research Scientist, U of W Applied Physics Laboratory, 1995-present
American Association of the Advancement of Science, 1974-present
American Astronomical Society, 1965-1974
American Geophysical Union, 1972-present
IEEE Geoscience and Remote Sensing Society, 1993-2003
International Glaciological Society, 1972-present
International Society for Optical Engineering, 1989-present

PROFESSIONAL ACTIVITIES

Member, DMSP/SSMI Sea Ice Science Working Group, NASA Science Steering Committee, 1982-1990
Member, Naval Studies Board Space Panel, NRC, NAS, 1983-1986
Consultant, Bechtel Power Corporation, 1986
Member, SSMI Validation Team, NASA, 1986-1990
Consulting Member, EARSeL Working Group A (European Association of Remote Sensing Laboratories), 1988-1997

Graduate student supervisor, Atmospheric Sciences
Program M.S. and Ph.D. candidates
Lecturer on polar research in Atmospheric Sciences/
Geophysics classes and at other institutions as invited speaker
Reviewer of numerous national agency proposals and scientific journal submissions

Translations from Russian of Scientific Articles and Books: (Буду снабжать примеры по просьбе.)

1. *Handbook of the Radiation Regime of the Arctic Basin (Results from the Drift Stations)*, by M. S. Marshunova and A. A. Mishin, edited by V. F. Radionov and R. Colony, University of Washington Applied Physics Laboratory Technical Rpt. 9413, 1994.
 2. *The Snow Cover of the Arctic Basin*, by V. F. Radionov, N. N. Bryazgin, and E. I. Alexandrov, University of Washington Applied Physics Laboratory Technical Report 9710, 95 pp., 1997.
 3. *Meteorological Hazards in the Russian Arctic*, by N. N. Bryazgin, and A. A. Dement'ev, 1996.
 4. *A Climatology of Arctic Clouds*, by I. N. Zav'yalova, 1999.
 5. *Technological Handbook of the Climate of Russia (Arctic Region) Solar Radiation*, ed. V. F. Radionov, Hydrometeorological Publishers, St. Petersburg, 1997.
- The last three translations have been included in the US-Russian Meteorological Atlas prepared by CIRES.

Budget Chairman, IGARSS 1998, Seattle, WA.
Review Committee, IGARSS 1998, Seattle, WA.

Scientific Instruments Designed & Constructed:

1. Submersible spectroradiometer for measuring spectral irradiance beneath sea ice, 1975.
2. Substantial improvements to submersible visible and near infrared spectrophotometer systems for polar applications - improvement of instrument throughput, detector sensitivity, spectral resolution, and data recording systems.
3. Field portable spectroradiometer for measuring albedo and incident spectral irradiance from 400-2750 nm, 1977.
4. A broadband turret type cosine collector for measurements of spectral irradiance, 1977.
5. Lightweight "skeleton" ice corer - specifically for use in the surface characterization part of passive microwave program, using the basic principle of the traditional SIPRE corer but weighing only 10 pounds for easy field portability. 1981.
6. Assorted Multichannel microwave radiometer mounting systems for use at field laboratories, on marine vessels, and at Arctic sea ice field sites, 1980-1994.
7. A matched pair of helicopter mounted 3 channel photometers to determine areal albedos, sea ice surface type distribution, and ice concentration. 1984.
8. Apparatus to measure liquid water content of snow including construction of 2 lb battery operated transmissometer. 1984.
9. Data buoy photometer system for 2 years automatic operation. 1985.
10. Ice profiling photometer system with fiber optics probe to determine irradiance profiles through and beneath sea or lake ice. 1985.
11. Horn lens antenna for K and Ka-Band microwave radiometers. 1989
12. Microwave quarter wave plates for fully polarimetric observations for X and Ka and W-Band microwave radiometers. 1989.
13. Miniature Nansen sled for polar field deployment of surface-based instrumentation, 1990.
14. An integration-sphere based cosine collector with improved angular and wavelength response

1997.

15. Profiling Spectrophotometer Probe and optical fiber system for measuring vertical irradiance distribution in sea ice. 1997.
16. Aerodynamic mounting pods to mount cameras and IR photometers on wing struts of Cessna 185 aircraft, 2000.
17. Quad channel spectroradiometer system for instantaneous observations of spectral albedo from 300-1100 nm, 2000.
18. A reflectance-based broadband cosine collector with improved angular and spectral response, 2000.
19. Improved Profiling Spectrophotometer Probe and optical fiber system for measuring vertical irradiance distribution in sea ice. 2000.
20. Construction of optical thermofiber for monitoring snow-ice interface temperature distribution of sea ice, 2001.
21. A hyperspectral apparatus for measuring bidirectional reflectance distribution functions from 350-2500 nm. 2003.
22. A light-weight field-portable irradiance calibration box. 2003.
23. Improved miniature Nansen sled for low temperature (-80oC) operation, 2003 & 2005.
24. Thermal infrared photometer apparatus for measuring infrared brightness temperature in the 8-14 micron band of snow and ice under polar conditions, 2003

Department Activities

Courses taught since 1990:

Atmos. Sci. 800	Sp. 1990 to Su. 1995
Atmos. Sci. 700	Sp. 1995 to Sp. 1996
Atmos. Sci. 800	Su. 1996 to Wi. 2000
Atmos. Sci. 492	Fall 2004 to Sp. 2005

Department representative to U of Washington Faculty Senate October 2001 – October 2005

Department Machine Shop Committee – *ad hoc* duties to present.

Department Committee on Infrastructure – Co-Chair with S. G. Warren, spring 2002.

OTHER SYNERGISTIC ACTIVITIES:

Participant in 40 field experiments at US and international research sites studying the electromagnetic properties of snow and ice.

Most recent experiments: Solar radiation processes on the East Antarctic Plateau, Dec-Feb 2004; and Healy-Oden Transarctic Expedition, 5 Aug to 30 Sept 2005. Soot in Arctic Snow, Feb 2006 ongoing – Arctic North America.

Numerous presentations at scientific conferences and to the general public on polar research topics.

PUBLICATIONS AND PRESENTATIONS IN ATMOSPHERIC SCIENCES

1. Roulet, R. R., G. A. Maykut and T. C. Grenfell, 1974, Spectrophotometers for the measurement of light in polar ice and snow, *J. Appl. Optics*, 13, 1652-1659.

2. Maykut, G. A. and T. C. Grenfell, 1975, The spectral distribution of light beneath first-year sea ice in the Arctic, *Limnol. Oceanogr.*, 20, 554-563.
3. Grenfell, T. C. and G. A. Maykut, 1977, The optical properties of ice and snow in the Arctic Basin, *J. Glaciol.*, 18, 445-63.
4. Grenfell, T. C., 1979, The effects of ice thickness on the exchange of solar radiation over the polar oceans, *J. Glaciol.*, 22, 305-20.
5. Grenfell, T. C., 1981, A visible and near infrared scanning photometer for field measurements of spectral albedo and irradiance under polar conditions, *J. Glaciol.*, 27, 476-81.
6. Grenfell, T. C. and D. K. Perovich, 1981, Radiation absorption coefficients of polycrystalline ice from 400 nm to 1400 nm, *J. Geophys. Res.*, 86, 7447-7450.
7. Grenfell, T. C., D. K. Perovich and J. A. Ogren, 1981: Spectral albedos of an alpine snow pack, *Cold Reg. Sci. Technol.*, 4, 121-127.
8. Perovich, D. K. and T. C. Grenfell, 1981, Laboratory studies of the optical properties of young sea ice, *J. Glaciol.*, 27, 331-346.
9. Perovich, D. K. and T. C. Grenfell, 1982, A theoretical model of radiative transfer in young sea ice, *J. Glaciol.*, 28, 341-357.
10. Grenfell, T.C., and S.G. Warren, 1983, Comments on "Spectral Albedos of Mid-Latitude Snowpacks", *Cold Regions Sci. & Tech.*, 8, 87-89.
11. Grenfell, T. C., 1983, A theoretical model of the optical properties of sea ice in the visible and near infrared, *J. Geophys. Res.*, 88, 9723-9735.
12. Grenfell, T. C. and D. Hedrick, 1983, Scattering of visible and near infrared radiation by NaCl ice and glacier ice, *Cold Reg. Sci. Technol.*, 8, 119-127.
13. Grenfell, T.C., 1984, Surface Based Brightness Temperatures of Sea Ice in the Bering and Greenland Seas, IGARSS'84 Symp.
14. Grenfell, T. C. and D. K. Perovich, 1984, Spectral albedos of sea ice and incident solar irradiance in the Southern Beaufort Sea, *J. Geophys. Res.*, 89, 3573-3580.
15. Grenfell, T. C. and A. W. Lohanick, 1985, Temporal variations of the microwave signatures of sea ice during the late spring and early summer near Mould Bay NWT, *J. Geophys. Res.*, 90, 5063-5074.
16. Grenfell, T. C., 1986, Surface based passive microwave observations of sea ice in the Bering and Greenland Seas, *IEEE Trans. Geosci. Remote Sens.*, GE-24, 378-382.
17. Grenfell, T. C., 1986, Determination of the liquid water content of snow by the dye dilution technique, *Cold Reg. Sci. Technol.*, 12, 295-298.
18. Grenfell, T. C. and J. C. Comiso, 1986, Multifrequency passive microwave observations of first-year sea ice grown in a tank, *IEEE Trans. Geosci. Remote Sens.*, GE-24(6), 826-831.
19. Grenfell, T. C. and D. K. Perovich, 1986: Optical properties of ice and snow in the polar oceans. II. Theoretical calculations, in Ocean Optics VIII, M. A. Blizard (ed), Proc. SPIE 637, 242-251.
20. Lohanick, A. W. and T. C. Grenfell, 1986, Variations in brightness temperature over cold first-year sea ice near Tuktoyaktuk, NWT, *J. Geophys. Res.*, 91, 5133-5144.
21. Perovich, D. K., G. A. Maykut and T. C. Grenfell, 1986, Optical properties of ice and snow in the polar oceans. I. Observations, In Ocean Optics VIII, M. A. Blizard (ed), Proc. SPIE 637, 232-241.
22. Warren, S. G., T. C. Grenfell and P. C. Mullen, 1986, Optical properties of antarctic snow, *Antarc. J. US*, 21, 247-248.

23. Burns, B. A., D. J. Cavalieri, M. R. Keller, W. J. Campbell, T. C. Grenfell, G. A. Maykut and P. Gloersen, 1987, Multisensor comparison of ice concentration estimates in the marginal ice zone, *J. Geophys. Res.*, *92*, 6843-6856.
24. Onstott, R. G., T. C. Grenfell, C. Mätzler, C. A. Luther and E. A. Svendsen, 1987, Evolution of microwave sea ice signatures during early summer and midsummer in the marginal ice zone, *J. Geophys. Res.*, *92*, 6825-6835.
25. Svendsen, E., C. Mätzler and T. C. Grenfell, 1987, A model for retrieving total sea ice concentration from a spaceborne dual-polarized passive microwave instrument operating near 90 GHz, *Int'l. J. Remote Sens.*, *8*, 1479-1487.
26. Eicken, H., T. C. Grenfell and B. Stonehouse, 1988, Sea ice conditions during an early spring voyage in the eastern Weddell Sea, Antarctica, *Polar Record*, *24*, 49-54.
27. Comiso, J. C., T. C. Grenfell, D. L. Bell, M. A. Lange and S. F. Ackley, 1989, Passive microwave in situ observations of winter Weddell sea ice, *J. Geophys. Res.*, *94*, 10,891-10,905.
28. Grenfell, T. C., 1989, Ship based passive microwave observations in the western Weddell Sea during the winter and early spring, in Microwave Remote Sensing in the Earth System, Ed. A. Chedin, A. Deepak Publ., Hampton, VA, 141-148.
29. Grenfell, T. C., 1990, Multilayer radiative transfer model for translucent geophysical surfaces with specific application to sea ice, in Ocean Optics X, R. W. Spinrad, ed., Proc. SPIE 1302, 532-544.
30. Tucker, W. B. III, T. C. Grenfell, R. G. Onstott, D. K. Perovich, A. J. Gow, R. A. Shuchman and L. L. Sutherland, 1991, Microwave and physical properties of sea ice in the winter marginal ice zone, *J. Geophys. Res.*, *96*, 4573-4587.
31. Shuchman, R., O. M. Johannessen, B. A. Farrelly, J. A. Johannessen, E. A. Svendsen, B. Burns, W. J. Campbell, P. Gloersen, T. C. Grenfell, J. Hollinger, M. Keller, C. Mätzler, R. Onstott and D. Ross, 1990: Remote sensing of the Greenland Sea marginal ice zone during MIZEX East '83, *Int'l. J. Remote Sens.*
32. Maykut, G. A., D. K. Perovich and T. C. Grenfell, 1991, Photometric determination of sea ice concentration and meltpond coverage from airborne sensors, *J. Geophys. Res.* (in preparation)
33. Brandt, R. E., T. C. Grenfell, and S. G. Warren, 1991, Optical properties of snow, *Antarctic J. U.S.*, *26*(5), 272-275.
34. Grenfell, T. C., 1991, A Radiative Transfer Model for Sea Ice With Vertical Structure Variations, *J. Geophys. Res.*, Vol.96, No.C9, Pages 16,991-17,001.
35. Grenfell, T. C., 1992, Surface based passive microwave studies of multiyear sea ice, *J. Geophys. Res.*, Vol. 97, No. C3, pp 3485-3501.
36. Maykut, G. A., T. C. Grenfell and W. F. Weeks, 1992, On estimating spatial and temporal variations in the properties of ice in the Polar Oceans, *J. Marine Systems* *3*, 41-72.
37. Grenfell, T.C., D. J. Cavalieri, J. C. Comiso, M. R. Drinkwater, R. G. Onstott, I. Rubinstein, K. Steffen, D. P. Winebrenner, 1992, Considerations for remote sensing of thin sea ice, Chapter 14 in Microwave Remote Sensing of Sea Ice, F. Carsey, ed., AGU, 291-300.
38. Winebrenner, D. P., J. Bredow, M. R. Drinkwater, A. K. Fung, A. J. Gow, T. C. Grenfell, H. C. Han, J. K. Lee, J. A. Kong, S. Mudaliar, S. Nghiem, R. G. Onstott, D. K. Perovich, L. Tsang, R. D. West, 1992, Microwave sea ice signature modeling, Chapter 8 in Microwave Remote Sensing of Sea Ice, F. Carsey, ed., AGU, 137-171.

39. Eppler, D. T., M. R. Anderson, D. J. Cavalieri, J. Comiso, L. D. Farmer, C. Garrity, P. Gloersen, T. C. Grenfell, M. Hallikainen, A. W. Lohanick, C. Maetzler, R. A. Melloh, I. Rubinstein, C. T. Swift, 1992, Passive microwave signatures of sea ice, Chapter 4 in Microwave Remote Sensing of Sea Ice, F. Carsey, ed., AGU, 47-68.
40. Swift, C. T., K. St. Germain, K. C. Jezek, S. P. Gogineni, A. J. Gow, D. K. Perovich, T. C. Grenfell, R. G. Onstott, 1992, Laboratory investigations of the electro-magnetic properties of artificial sea ice, Chapter 9 in: Microwave Remote Sensing of Sea Ice, F. Carsey, ed., AGU, 177-199.
41. Comiso, J. C., T. C. Grenfell, M. Lange, A. Lohanick, R. Moore, and P. Wadhams, 1992, Microwave remote sensing of the southern ocean ice cover, Chapter 12 in Microwave Remote Sensing of Sea Ice, F. Carsey, ed., AGU, 243-258.
42. Gogineni, S. P., R. K. Moore, T. C. Grenfell, D. G. Barber, S. Digby, and M. Drinkwater, 1992, The effects of freeze-up and melt processes on microwave signatures, Chapter 17 in Microwave Remote Sensing of Sea Ice, F. Carsey, ed., AGU, 329-340.
43. Sturm, M., T. C. Grenfell, and D. K. Perovich, 1993, Passive microwave measurements of tundra and taiga snow covers in Alaska, U.S.A., *Ann. Glaciol.*, 17, 125-130.
44. St. Germain, K. M., C. T. Swift, and T. C. Grenfell, 1992, Determination of Dielectric Constant of Young Sea Ice Using Microwave Spectral Radiometry, *J. Geophys. Res.*, 98, 4675-4679.
45. Wensnahan, M. R., T. C. Grenfell, D. P. Winebrenner and G. A. Maykut, 1993, Observations and theoretical studies of microwave emission from thin saline ice, *J. Geophys. Res.*, 98, 8531-8545.
46. Wensnahan, M. R., G. A. Maykut, T. C. Grenfell and D. P. Winebrenner, 1993, Passive microwave remote sensing of thin sea ice using principal component analysis, *J. Geophys. Res.*, 98, 12,453-12,468.
47. Grenfell, T. C., D. P. Winebrenner, M. R. Wensnahan, Passive microwave signatures of simulated pancake ice and young pressure ridges, IGARSS '92, Houston, Texas, May 26-29, 1992, p. 1253-1255, 1992.
48. Winebrenner, D. P., T. C. Grenfell, L. Tsang and R. D. West, On microwave sea ice signature modeling: Connecting models to the real world, IGARSS '92, Houston, Texas, May 26-29, 1992, p. 1268-1270, 1992.
49. Grenfell, T.C. and D.K. Perovich, 1993, Passive Microwave Study of Thin Sea Ice from the Arctic Lead Experiment, Abstract in PIERS 1993 Proceedings, 476.
50. Winebrenner, D. P., T.C. Grenfell, and M. R. Wensnahan, 1993, Modeling the Temporal Evolution of L-Band Polarimetric SAR Observations of Growing Sea Ice in Arctic Leads, Abstract in PIERS 1993 Proceedings, 478.
51. Perovich, D. K., G. F. Cota, G. A. Maykut and T. C. Grenfell, Bio-optical observations of first-year Arctic sea ice, *J. Geophys. Res.*, 20, 1059-1062, 1993.
52. Grenfell, T. C., J. C. Comiso, M. A. Lange, H. Eicken, M. R. Wensnahan, 1994, Passive microwave observations of the Weddell Sea during austral winter and early spring, *J. Geophys. Res.*, 99, 9,995-10,010.
53. Grenfell, T.C., S.G. Warren, P. Mullen, Reflection of solar radiation by the Antarctic snow surface at ultraviolet, visible, and near-infrared wavelengths, *J. Geophys. Res.*, Vol 99 D9, 18,669-18,684, 1994.
54. Grenfell, T.C., M.R. Wensnahan, and D. P. Winebrenner, Passive microwave signatures of simulated pancake ice and young pressure ridges, *Remote Sensing Rev.*, Vol. 9, pp. 51-64, 1994.

55. Grenfell, T.C., and D.K. Perovich, 1994, Analysis of Surface-Based Passive Microwave Observations during LEADDEX 1992, Proceedings of IGARSS '94, 1005-1007.
56. Grenfell, T.C., M. R. Wensnahan, and D. P. Winebrenner, 1994, Measurements of Microwave Emission from New and Young Saline Ice during the 1993 CRREL Pond Experiment, IGARSS '94 Proceedings, 605-607.
57. Lohanick, A. W., and T. C. Grenfell, Snow Cover Characterization, 1994, EMPOSI 94 Field Experiment at Barrow Alaska, Data Report.
58. Grenfell, T. C., M. R. Wensnahan, D. P. Winebrenner and L. Zurk, 1995:Passive Microwave and Infrared Observations of New and Young Sea Ice - The 1994 CRREL Pond Experiment, Abstract in PIERS 1995 Proceedings, 66.
59. Grenfell, T. C., D. P. Winebrenner and A. W. Lohanick, 1995, Passive Microwave and Thermal Infrared Emissivities of First-Year Sea Ice Near Point Barrow Alaska, Abstract in PIERS 1995 Proceedings, 479.
60. Podgorny, I. A., and T. C. Grenfell, 1996, Partitioning of Solar Energy in Melt Ponds from Measurements of Pond Albedo and Depth, *J. Geophys. Res.*, *101*, 22,737-22,748.
61. Podgorny, I. A., and T. C. Grenfell, 1996, Absorption of solar energy in a cryoconite hole, *Geophys. Res. Letters*, *23*, 2465-2468.
62. Grenfell, T. C., Microwave and thermal infrared emission from young sea ice and pancake ice, Proceedings of IGARSS '96, 1199-1201, 1996.
63. Wensnahan, M. R., T. C. Grenfell, G. A. Maykut and D. P. Winebrenner, Physical properties affecting the passive microwave signature of thin sea ice, *J. Geophys. Res.*, submitted.
64. Wensnahan, M. R., G. A. Maykut, T. C. Grenfell and D. P. Winebrenner, Predicting geophysical parameters associated with thin sea ice from passive microwave satellite data, *J. Geophys. Res.*, submitted.
65. Grenfell, T. C., Comparison of the passive microwave signatures of sea ice in the Weddell Sea with results from the Northern Hemisphere, Invited presentation at Gordon Research Conference on Sea Ice Ecology, 2-7 March, Ventura CA, 1997.
66. Light, B., H. Eicken, G. A. Maykut, and T. C. Grenfell, The effect of particulates on radiative transfer in sea ice, presentation at Gordon Research Conference on Sea Ice Ecology, 2-7 March, Ventura CA, 1997.
67. Light, B., H. Eicken, G. A. Maykut, and T. C. Grenfell, The effect of included particulates on the spectral albedo of sea ice, *J. Geophys. Res.*, *103*, No. C12, 27,739-27,752, **1998**.
68. Nghiem, S. V., R. Kwok, S. H. Yueh, A. J. Gow, D. K. Perovich, C. C. Hsu, K. H. Ding., J. A. Kong, T. C. Grenfell, Diurnal thermal cycling effects on backscatter and emissivity of thin sea ice, *IEEE TGRS*, *36*, No.1, 111-124, **1998**.
69. Jezek, K. A., D. K. Perovich, K. M. Golden, D. G. Barber, P. Gogineni, T. C. Grenfell, A. K. Jordan, C. D. Mobley, S. V. Nghiem, and R. G. Onstott, A broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice, *IEEE TGRS*, *36*, No.5, 1633-1641, **1998**.
70. Grenfell, T. C., D. G. Barber, A. K. Fung, A. J. Gow, K. C. Jezek, E. J. Knapp, S. V. Nghiem, R. G. Onstott, D. K. Perovich, C. S. Roesler, C. T. Swift, and F. Tanis, Evolution of electromagnetic signatures of sea ice from initial formation to the establishment of thick first-year ice, *IEEE TGRS*, *36*, No.5, 1642-1654, **1998**.
71. Golden, K., M. Cheney, K. H. Ding, A. K. Fung, T. C. Grenfell, D. Isaacson, J. A. Kong, S. V. Nghiem, J. Sylvester, and D. P. Winebrenner, Forward electromagnetic scattering models for sea ice, *IEEE TGRS*, *36*, No.5, 1655-1674, **1998**.

72. Perovich, D. K., J. Longacre, D. G. Barber, R. A. Maffione, G. F. Cota, C. D. Mobley, A. J. Gow, R. G. Onstott, T. C. Grenfell, W. S. Pegau, M. Landry, and C. S. Roesler, Field observations of the electromagnetic properties of first-year sea ice, *IEEE TGRS*, 36, No.5, 1705-1715, **1998**.
73. Mobley, C. D., G. F. Cota, T. C. Grenfell, R. A. Maffione, W. S. Pegau, and D. K. Perovich, Modeling light propagation in Sea Ice, *IEEE TGRS*, 36, No.5, 1743-1749, **1998**.
74. Barber, D. G., A. K. Fung, T. C. Grenfell, S. V. Nghiem, R. G. Onstott, V. I. Lytle, D. K. Perovich, and A. J. Gow, The role of snow cover on microwave emission and scattering over first-year sea ice, *IEEE TGRS*, 36, No.5, 1750-1763, **1998**.
75. Onstott, R., S. P. Gogineni, A. J. Gow, T. C. Grenfell, K. C. Jezek, D. K. Perovich and C. T. Swift, Electromagnetic and physical properties of sea ice formed in the presence of wave action, *IEEE TGRS*, 36, No.5, 1764-1783, **1998**.
76. Grenfell, T. C. and S. G. Warren, Representation of a nonspherical ice particle by an assembly of spheres, Conference on Light Scattering by Nonspherical Particles: Theory, Measurements, and Applications, Sponsored by NASA and AMS, NASA Goddard Institute for Space Studies, NYC, NY, 29 Sept to 1 Oct **1998**.
77. Furhop, R., T. C. Grenfell, G. Heygster, K-P, Johnsen, P. Schlüssel, M. Schrader, C. Simmer, A combined radiative transfer model for sea ice, open ocean, and atmosphere, *Radio Science*, 33, No.2, 303-316, **1998**.
78. Grenfell, T. C., D. K. Perovich, B. Light, J. A. Richter-Menge, W. B. Tucker III, G. A. Maykut, The seasonal evolution of albedo during SHEBA, Fall Meeting of the American Geophysical Union, Dec. **1998**.
79. Tucker, W. B. III, D. K. Perovich, J. A. Richter-Menge, T. C. Grenfell, B. Light, H. Eicken, J. Ukita, G. A. Maykut and B. Elder, The many faces of melt, Fall Meeting of the American Geophysical Union, Dec. **1998**.
80. Grenfell, T. C., D. K. Perovich, B. Light, J. Richter-Menge, W. B. Tucker III, G. A. Maykut, Seasonal & Spatial Dependence of Albedo during SHEBA, presented at SHEBA/FIRE Workshop, Tucson AZ, 25 to 28 January **1999**.
81. Grenfell, T. C., B. Light, and M. Sturm, Soot content of the snowpack in the vicinity of the SHEBA field site, presented at SHEBA/FIRE Workshop, Tucson AZ, 25 to 28 January **1999**.
82. Grenfell, T. C., Considerations for the parameterization of albedo and transmission of sea ice in climate models, invited presentation at the GISS Workshop on the Role of Sea Ice in Global Climate Variability and Change, NASA Goddard Space Flight Center, GISS, New York, NY, 11 to 12 March **1999**, invited presentation.
83. Grenfell, T. C., D. K. Perovich, B. Light, J. A. Richter-Menge, W. B. Tucker III, G. A. Maykut, The seasonal evolution of albedo during SHEBA, NASA Goddard Space Flight Center, GISS, New York, NY, 11 to 12 March **1999**, poster presentation.
84. Grenfell, T. C. and D. K. Perovich, Sea Ice Albedo: Temporal Evolution and Spatial Variability, invited presentation at GISS Workshop on the Role of Sea Ice in Global Climate Variability and Change, NASA Goddard Space Flight Center, GISS, New York, NY, 11 to 12 March **1999**, invited presentation.
85. Grenfell, T. C., D. K. Perovich, B. Light, J. A. Richter-Menge, W. B. Tucker III, G. A. Maykut, The seasonal evolution of albedo during SHEBA, ARCUS: The Arctic Forum, March **1999**.

86. Grenfell, T. C., D. K. Perovich, B. Light, J. A. Richter-Menge, W. B. Tucker III, G. A. Maykut, Local and Regional Evolution of Sea Ice Albedo in the Arctic, 29th Annual Arctic Workshop, University of Washington, Seattle, 11 to 13 April **1999**.
87. Warren, S. G. and T. C. Grenfell, Representation of a nonspherical ice particle by a collection of independent spheres for scattering and absorption of radiation, 10th AMS Conference of Atmospheric Radiation, 28 June to 2 July 1999, Madison, Wisconsin, 595-598, **1999**.
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