

Numerical Prediction of Tropical Weather Systems.....	Banner I. Miller, Peter P. Chase, and Brian R. Jarvinen	825-835
Cumulative Results of Extended Forecast Experiments: I. Model Performance for Winter Cases	K. Miyakoda, G. D. Hembree, R. F. Strickler, and I. Shulman	836-855
Forecasting With a Global, Three-Layer, Primitive-Equation Model.....	Lloyd W. Vanderman	856-868
Use of Model Output Statistics for Predicting Ceiling Height.....	Joseph R. Boechieri and Harry R. Glahn	869-879
Picture of the Month—Thin Line Convection.....	Frances C. Parmenter and Stanley W. Wright	880-881
Weather and Circulation of September 1972—Another August–September Reversal.....	A. James Wagner	882-888
Contents, Volume 100.....		889-892
Correction Notices.....		892
Index, Volume 100.....		892-900

## Correction Notices

Vol. 99, No. 12, Dec. 1971, p. 901, right col: eq (50) and (51) should read

$$Q_{ws} = 3.8p^{-1}10^{\frac{7.5(T-273)}{T-36}} \quad (50)$$

$$Q_{ts} = 3.8p^{-1}10^{\frac{9.5(T-273)}{T-8}} \quad (51)$$

Vol. 100, No. 2, Feb. 1972, p. 90, left col., line 5: "latter" is to be read instead of "potential evaporation rate."

Vol. 100, No. 6, June 1972, p. 421, left col: eq (12) should read

$$m_g = \frac{\pi \times 10^6}{6} (0.4483D_e)^3 \quad (g). \quad (12)$$

Vol. 100, No. 9, Sept. 1972, p. 698, right col., line 5: the sentence is to be read "Only the central Great Basin, Southern Great Plains, and northern Maine had average temperatures substantially above normal for the week."

## Index, Volume 100

### A

Accuracy of objective analysis at stratospheric levels: 218.

Advection equation: note on the computational stability of Lax-Wendroff form. 72, 682.

AGEE, ERNEST M.:

Note on ITCZ wave disturbances and formation of tropical storm Anna. 733.

Air pollution episode in New York City, 1966 Thanksgiving week. 445.

Airborne radar observations of eye configuration changes, bright band distribution, and precipitation tilt during 1969 multiple seeding in hurricane Debbie. 208.

Air-sea interaction: modification of surface air over Lake Ontario. 662.

Analysis of semidiurnal tidal motions between 30 and 60 km. 579.

Analysis tool—vertically integrated liquid water. 548.

ANGELL, J. K.:

Climatological aspects of circulation in Southern Hemisphere temperate latitudes as determined from 200-mb GHOST balloon flights. 107.

Angular momentum vertical transport: effects of internal gravity waves over mountainous terrain. 177.

Annulus wave: baroclinic field distributions and balances. 29.

Anomalous gradient winds: existence and implications. 709.

ANTHES, RICHARD A.:

Development of asymmetries in three-dimensional numerical model of tropical cyclone. 461.

Application of stepwise multiple regression techniques to inversion of Nimbus "IRIS" observations. 336.

Approximating polynomials for estimating wind, divergence, and vertical motion. 345.

Apr. 1972 weather and circulation. 590.

Arcus cloud. 817.

ASSELIN, RICHARD:

Frequency filter for time integrations. 487.

ASTLING, ELFORD G.:

and Lyle H. Horn. Atmospheric energy transport over North America for 3 winter mo. 491.

Asymmetries in three-dimensional numerical model of tropical cyclone. 461.

Atlantic hurricane season of 1971. 256.

Atlantic tropical systems of 1971. 268.

Atmospheric behavior using quasi-geostrophic, diabatic, two-level model. 477.

Atmospheric density variations and determination of density errors from selected rocketsonde sensors. 189.

Atmospheric development theory. 145.

Atmospheric energy transport over North America for 3 winter mo. 491.

AUER, AUGUST H., JR.:

Distribution of graupel and hail with size. 325.

Aug. 1972 weather and circulation. 819.

Available potential energy generation and heat sources and sinks during southwest monsoon season in Indian region. 383.

AVARA, ELTON P.:

and Bruce T. Miers and Robert O. Olsen. Short time period atmospheric density variations and determination of density errors from selected rocketsonde sensors. 189.

## B

Baroclinic annulus wave: field distributions and balances. 29.

Baroclinic atmosphere model: implicit time integration scheme. 329.

Baroclinic instability and the theory of atmospheric development. 145.

Bermuda yacht race: 1970 meteorological and oceanographic conditions. 597.

BLACK, PETER G.:

and Harry V. Senn and Charles L. Courtright. Airborne radar observations of eye configuration changes, bright band distribution, and precipitation tilt during 1969 multiple seeding experiments in hurricane Debbie. 208.

BOCCHIERI, JOSEPH R.:

and Harry R. Glahn. Use of model output statistics for predicting ceiling height. 869.

BOURKE, WILLIAM:

An efficient, one-level, primitive-equation spectral model. 683.

BRANDLI, HENRY W.:

Picture of month—real time ESSA 8 APT tracked over Australia received at Florida over 11,000 mi away. 749.

Breaking waves at inversion. 133.

BRIDGES, W. C.:

and D. R. Davis. Weather note—minimal tropical depression produces record rains and unprecedented floods. 294.

## C

CANFIELD, NORMAN L.:

and Marvin E. Miller, Terry A. Ritter, and C. Richard Weaver. Visibility changes in Ohio, Kentucky, and Tennessee from 1962 to 1969. 67.

CARPENTER, THOMAS H.:

and Ronald L. Holle and Jose J. Fernandez-Partagas. Observed relationships between lunar tidal cycles and formation of hurricanes and tropical storms. 451.

Ceiling height prediction using model output statistics. 869.

Centennial of Monthly Weather Review, 1872–1972. 517.

Chaff trajectories near severe thunderstorm. 653.

Changes in visibility in Ohio, Kentucky, and Tennessee, 1962–69. 67.

CHASE, PETER P.:

and Banner I. Miller and Brian R. Jarvinen. Numerical prediction of tropical weather systems. 825.

CHOW, C. F.:

and E. C. Kindle and F. M. Vukovich. Study of atmospheric behavior using a quasi-geostrophic, diabatic, two-level model. 477.

CLARK, ROBERT A.:

and Douglas R. Greene. Vertically integrated liquid water—a new analysis tool. 548.

CLARKE, REGINALD H.:

Note on nocturnal radiation reversal. 354.

Numerical modeling of a case of nocturnal radiation reversal. 357.

Climatological aspects of circulation in Southern Hemisphere temperate latitudes from 200-mb GHOST balloon flights. 107.

Climatological studies of large-scale circulation in Northern Hemisphere: I. Zonal and meridional indices at 700-mb level. 553.

Cloud dynamics: parameterization of ice growth for numerical calculations. 417.

Cloud lines: anomalous or ship trails. 646.

Cloud physics: use of gamma distribution in single-cloud rainfall analysis. 309.

Cloud physics model:

growth of large hail. 196.

numerical simulation of precipitation development in supercooled cumuli—parts I, II. 757, 764.

Cloud seeding:

airborne radar observations during 1969 multiple seeding experiments in hurricane Debbie. 208.

optimization of warm-cloud seeding agents by microencapsulation. 153.

use of gamma distribution in single-cloud rainfall analysis. 309.

Coastal winds kinetic energy spectrum. 671.

Comparison of visible, infrared, and moisture channel data. 318.

Computation of upper tropospheric reference heights from winds 808.

Computational stability of two-step Lax-Wendroff advection equation. 72, 682.

Conditional probability for exact, noncategorized initial condition. 796.

Conservative finite-difference approximations of primitive equations on quasi-uniform spherical grids. 136.

Contents, Vol. 100. 889.

COOLEY, JACK R.:

Damaging, mischievous, and interesting whirlwinds and waterspouts. 317.

Correction notices: 244, 373, 892.

Correspondence:

computational stability of two-step Lax-Wendroff advection equation. 682.

daily tornado frequencies updated. 750.

meridional distribution of source and sink terms of kinetic energy balance. 747.

reply. 748.

“steam devils” over Lake Michigan during January arctic outbreak. 750.

COTTON, WILLIAM R.:

Numerical simulation of precipitation development in supercooled cumuli—parts I, II. 757, 764.

COURTRIGHT, CHARLES L.:

and Peter G. Black and Harry V. Senn. Airborne radar observations of eye configuration changes, bright band distribution, and precipitation tilt during 1969 multiple seeding experiments in hurricane Debbie. 208.

Cumulative results of extended forecast experiments: model performance for winter cases. 836.

Cumulus convection: numerical experiments on relation between microphysics and dynamics. 717.

## D

Daily tornado frequencies for contiguous United States. 238, 750.

Damaging, mischievous, and interesting whirlwinds and waterspouts. 317.

DANARD, MAURICE B.:

and Gandikota V. Rao. Numerical study of effects of Great Lakes on winter cyclone. 374.

DAVIS, D. R.:

and W. C. Bridges. Weather note—minimal tropical depression produces record rains and unprecedented floods. 294.

DEARDORFF, JAMES W.:

Parameterization of planetary boundary layer for use in general circulation models. 93.

Dec. 1971 weather and circulation. 239.

DENNEY, WILLIAM J.:

Eastern Pacific hurricane season of 1971. 276.

Density errors from selected rocketsonde sensors. 189.

Determination of thickness of stratospheric layers from single-channel satellite radiance measurements. 788.

- Development of asymmetries in three-dimensional tropical cyclone numerical model. 461.
- Diabatic heating and atmospheric behavior in quasi-geostrophic, two-level model. 477.
- DICKSON, ROBERT R.:  
 Weather and circulation of Oct. 1971—continued cold in West and warm in East. 74.  
 Weather and circulation of Dec. 1971—return to persistent temperature regime. 239.  
 Weather and circulation of Mar. 1972—hot and dry in Southwest. 511.  
 Weather and circulation of May 1972—continued drought in Southwest. 648.  
 Weather and circulation of Aug. 1972—five hurricanes in east Pacific. 819.
- Direct readout of infrared data. 117.
- Distance distributions for randomly distributed data. 60.
- Distribution of graupel and hail with size. 325.
- DOUGLAS, JIM, JR.:  
 and Hsuan-Heng Wang, Paul Halpern, and Todd Dupont. Numerical solutions of one-dimensional primitive equations using Galerkin approximations. 738.
- Drought in Southwest continues during Apr. 1972. 590, 648.
- DUPONT, TODD:  
 and Hsuan-Heng Wang, Paul Halpern, and Jim Douglas, Jr. Numerical solutions of one-dimensional primitive equations using Galerkin approximations. 738.
- E**
- Eastern Pacific hurricane season of 1971. 276.
- EDINGER, J. G.:  
 and M. G. Wurtele. Interpretation of phenomena observed in southern California stratus. 389.
- Effects of internal gravity waves on energy budgets and vertical transport of angular momentum over mountainous terrain. 177.
- Efficient, one-level, primitive-equation spectral model. 683.
- ELLIOTT, WILLIAM P.:  
 and Daniel E. Frye and Stephen Pond. Note on kinetic energy spectrum of coastal winds. 671.
- ENDLICH, R. M.:  
 and R. L. Mancuso, H. Shigeishi, and R. E. Nagle. Computation of upper tropospheric reference heights from winds for use with vertical temperature profile observations. 808.
- Energy budget effects of internal gravity waves over mountainous terrain. 177.
- Energy transformation at subsynoptic scale. 126.
- Energy transport over North America for 3 winter mo. 491.
- Estimating wind, divergence, and vertical motion profiles with approximating polynomials. 345.
- Evaluation of direct readout infrared data. 117.
- Evaporation and heat flux from large-scale parameters. 81.
- F**
- Feb. 1972 weather and circulation. 411.
- FERNANDEZ-PARTAGAS, JOSE J.:  
 and Thomas H. Carpenter and Ronald L. Holle. Observed relationships between lunar tidal cycles and formation of hurricanes and tropical storms. 451.
- Field distributions and balances in baroclinic annulus wave. 29.
- Filter for time integrations. 487.
- Finite-difference primitive-equations approximations on quasi-uniform spherical grids. 136.
- FISCHER, G.:  
 and V. Renner. Correspondence—comments on “Note on computational stability of two-step Lax-Wendroff form of advection equation.” 682.
- Fleet Numerical Weather Central operational primitive-equation model. 360.
- Flood:  
 minimal tropical depression produces record rains. 294.  
 weather and circulation of June 1972. 692.
- Forcing: response of tropical atmosphere. 518.
- Forecasting with global, three-layer, primitive-equation model. 856.
- Formation of tropical storm Anna. 733.
- FRANK, NEIL L.:  
 Atlantic tropical systems of 1971. 268.  
 Frequency filter for time integrations. 487.
- Frequency of tornadoes (daily) for contiguous United States. 238, 750.
- FRITZ, S.:  
 and S. D. Soules. Planetary variations of stratospheric temperatures. 582.
- FRITZ, SIGMUND:  
 and Raymond M. McInturff. Stratospheric temperature variations in autumn—Northern and Southern Hemispheres compared. 1.
- FRYE, DANIEL E.:  
 and Stephen Pond and William P. Elliott. Note on kinetic energy spectrum of coastal winds. 671.
- G**
- Galerkin approximations: numerical solutions of the one-dimensional primitive equations. 738.
- Gamma distribution:  
 reliability of precipitation probability estimates. 607.  
 single-cloud rainfall analysis. 309.
- GELMAN, MELVYN E.:  
 and Alvin J. Miller and Harold M. Woolf. Regression technique for determining temperature profiles in upper stratosphere from satellite-measured radiances. 542.  
 and Roderick S. Quiroz. Direct determination of the thickness of stratospheric layers from single-channel satellite radiance measurements. 788.
- General circulation models:  
 cumulative results of extended forecast experiments for winter cases. 836.  
 forecasting with global, three-layer, primitive-equation model. 836.  
 parameterization of planetary boundary layer. 93.  
 response of ocean-atmosphere model to seasonal variation of solar radiation. 42.
- Geostrophic wind deviation in upper troposphere and lower stratosphere in El Paso–White Sands area. 159.
- GERRITY, JOSEPH P., JR.:  
 Note on computational stability of two-step Lax-Wendroff form of advection equation. 72.
- GHOST balloon flights at 200-mb in Southern Hemisphere. 107.
- GLAHN, HARRY R.:  
 and Joseph R. Bocchieri. Use of model output statistics for predicting ceiling height. 869.
- Global sea-surface temperatures determined from satellite. 10.
- GORDON, ADRIAN H.:  
 Correspondence—comments on “On meridional distribution of source and sink terms of kinetic energy balance.” 747.
- GORDON, HARRY:  
 Daily tornado frequencies for contiguous United States. 238.  
 Daily tornado frequencies updated. 750.
- Gradient winds: existence and implications of anomalous values. 709.
- Graupel: size distribution. 325.
- Gravity wave effects on energy budgets and vertical transport of angular momentum. 177.
- Great Lakes effects on a winter cyclone. 374.
- GREENE, DOUGLAS R.:  
 and Robert A. Clark. Vertically integrated liquid water—a new analysis tool. 548.
- GRINGORTEN, IRVING I.:  
 Conditional probability for exact, noncategorized initial condition. 796.

Ground-based microwave determination of low-altitude temperature profiles. 15.  
Growth of large hail. 196.  
Gulf of California: surges of maritime tropical air northward. 298.

## H

Hail:  
  growth. 196.  
  size distribution. 325.  
HALES, JOHN E., JR.:  
  Surges of maritime tropical air northward over the Gulf of California. 298.  
HALLETT, JOHN:  
  Breaking waves at an inversion. 133.  
HALPERN, PAUL:  
  and Hsuan-Heng Wang, Jim Douglas, Jr., and Todd Dupont.  
  Numerical solutions of one-dimensional primitive equations using Galerkin approximations. 738.  
Heat flux and evaporation evaluation at surface using large-scale parameters. 81.  
Heat sources and sinks and available potential energy generation in Indian region during southwest monsoon season. 383.  
HEIGHES, J. M.:  
  Correspondence—comment on "Picture of month—'steam devils' over Lake Michigan during January arctic outbreak." 750.  
Helmholtz equations: method of solution. 644.  
HEMBREE, G. D.:  
  and K. Miyakoda, R. F. Strickler, and I. Shulman. Cumulative results of extended forecast experiments: I. Model performance for winter cases. 836.  
HENDERSON, JOHN:  
  and André Robert and Colin Turnbull. Implicit time integration scheme for baroclinic models of the atmosphere. 329.  
High-level warmings over tropical station. 674.  
HOLLE, RONALD L.:  
  and Thomas H. Carpenter and Jose J. Fernandez-Partagas. Observed relationships between lunar tidal cycles and formation of hurricanes and tropical storms. 451.  
  and H. Michael Mogil. Anomalous gradient winds: existence and implications. 709.  
HOLZWORTH, GEORGE C.:  
  Vertical temperature structure during 1966 Thanksgiving week air pollution episode in New York City. 445.  
HOPE, JOHN R.:  
  and Charles J. Neumann. Performance analysis of HURRAN tropical cyclone forecast system. 245.  
  and R. H. Simpson. Atlantic hurricane season of 1971. 256.  
HORN, LYLE H.:  
  and Elford G. Astling. Atmospheric energy transport over North America for 3 winter mo. 491.  
Hurricane and tropical storm formation related to lunar tidal cycles. 451.  
Hurricane forecasting: performance of HURRAN tropical cyclone forecast system. 245.  
Hurricanes:  
  airborne radar observations during 1969 multiple seeding in Debbie. 208.  
  Atlantic hurricane season, 1971. 256.  
  eastern Pacific hurricane season, 1971. 276.  
  August 1972—five hurricanes in east Pacific. 819.

## I

Ice growth parameterization for numerical calculations of cloud dynamics. 417.  
Implicit time integration scheme for baroclinic models. 329.  
Index, Vol. 100. 892.  
Infrared data direct readout evaluation. 117.

Initial condition that is exact, noncategorized: conditional probability. 796.  
Initial value problems and theory of atmospheric development. 145.  
Internal gravity wave effects on energy budgets and vertical transport of angular momentum. 177.  
Interpolation optimum from observations of mixed quality. 612.  
Inversion of Nimbus "IRIS" observations. 336.  
Inversions:  
  breaking waves. 133.  
  vertical temperature structure during 1966 Thanksgiving air pollution episode in New York City. 445.  
IRSCH, FRANK E. III:  
  and Barry Saltzman. Note on theory of topographically forced planetary waves in atmosphere. 441.  
ITCZ wave disturbances and formation of tropical storm Anna. 733.

## J

Jan. 1972 weather and circulation. 322.  
JARVINEN, BRIAN R.:  
  and Banner I. Miller and Peter P. Chase. Numerical prediction of tropical weather systems. 825.  
JEHN, KENNETH H.:  
  and Hsing-Wu Wu. Geostrophic wind deviation in upper troposphere and lower stratosphere in El Paso-White Sands area. 159.  
JESSUP, EDWARD A.:  
  Interpretations of chaff trajectories near a severe thunderstorm. 653.  
Jet stream and heavy precipitation relationship. 434.  
JIUSTO, JAMES E.:  
  and Michael L. Kaplan. Snowfall from lake-effect storms. 62.  
JOHNSON, DONALD R.:  
  and Phillip J. Schmidt. Use of approximating polynomials to estimate profiles of wind, divergence, and vertical motion. 345.  
JOHNSON, KEITH W.:  
  Accuracy of objective analysis at stratospheric levels. 218.  
July 1972 weather and circulation. 751.  
June 1972 weather and circulation. 692.

## K

KANGIESER, PAUL C.:  
  Weather note—unusually heavy 24-hr rainfall at Workman Creek 1, Ariz. 206.  
KAPLAN, MICHAEL L.:  
  and James E. Jiusto. Snowfall from lake-effect storms. 62.  
KEEGAN, THOMAS J.:  
  Evaluation of direct readout infrared data. 117.  
KESEL, PHILIP G.:  
  and Francis J. Winninghoff. Fleet Numerical Weather Central operational primitive-equation model. 360.  
KINDLE, E. C.:  
  and C. F. Chow and F. M. Vukovich. Study of atmospheric behavior using a quasi-geostrophic, diabatic, two-level model. 477.  
Kinetic energy spectrum of coastal winds. 671.  
KOCHANSKI, ADAM:  
  Semiannual variation at base of thermosphere. 222.  
KOENIG, L. RANDALL:  
  Parameterization of ice growth for numerical calculations of cloud dynamics. 417.  
  and F. W. Murray. Numerical experiments on relation between microphysics and dynamics in cumulus convection. 717.  
KOFFLER, R.:  
  and P. Krishna Rao and W. L. Smith. Global sea-surface temperature distribution determined from environmental satellite. 10.

- KRISHNA RAO, P.:  
and W. L. Smith and R. Koffler. Global sea-surface temperature distribution determined from environmental satellite. 10.
- KUNG, ERNEST C.:  
Correspondence—reply (to comments on “On the meridional distribution of source and sink terms of the kinetic energy balance”). 748.  
and Donald H. McInnis. Study of subsynoptic scale energy transformations. 126.

## L

- Laboratory simulation of wake effects on second and third thermals in a series. 399.
- Lake effects:  
on storm snowfall. 62.  
on surface air over Lake Ontario in winter. 662.
- Lake Ontario—modification of over-lake surface air in winter. 662.
- Lax-Wendroff form of advection equation—computational stability. 72, 682.
- Liquid water vertically integrated—new analysis tool. 548.
- LIVINGSTON, RICHARD L.:  
Picture of month—unusual arcus cloud. 817.
- Long-range forecasting: cumulative results of extended forecast experiments for winter cases. 836.
- Lunar tidal cycles and hurricane formation. 451.
- LYONS, WALTER A.:  
and Steven R. Pease. Picture of month—“Steam devils” over Lake Michigan during January arctic outbreak. 235.

## M

- MANABE, SYUKURO:  
and Richard T. Wetherald. Response of joint ocean-atmosphere model to seasonal variation of solar radiation. 42.
- MANCUSO, R. L.:  
and R. M. Endlich, H. Shigeishi, and R. E. Nagle. Computation of upper tropospheric reference heights from winds for use with vertical temperature profile observations. 808.
- Mar. 1972 weather and circulation. 511.
- MARION, ERNEST W.:  
and Eugene M. Wilkins and Yoshikazu Sasaki. Laboratory simulation of wake effects on second and third thermals in series. 399.
- Maritime tropical air surges northward over Gulf of California. 298.
- May 1972 weather and circulation. 648.
- McINNIS, DONALD H.:  
and Ernest C. Kung. Study of subsynoptic scale energy transformations. 126.
- McINTURFF, RAYMOND M.:  
and Sigmund Fritz. Stratospheric temperature variations in autumn—Northern and Southern Hemispheres compared. 1.  
and Alvin J. Miller. Note on variations in the “quasi-biennial” oscillation. 785.
- Meridional and zonal indices at 700-mb level in Northern Hemisphere. 553.
- Mesoscale wind fields and transport estimates from network of wind towers. 565.
- Meteorological and oceanographic conditions during 1970 Bermuda yacht race. 597.
- Method for solving simultaneous Helmholtz equations. 644.
- Microencapsulation techniques for optimization of warm-cloud seeding agents. 153.
- Microwave determination of low altitude temperature profiles. 15.
- MIERS, BRUCE T.:  
and Elton P. Avara and Robert O. Olsen. Short time period atmospheric density variations and determination of density errors from selected rocketsonde sensors. 189.

- MILLER, ALVIN J.:  
and Melvyn E. Gelman and Harold M. Woolf. Regression technique for determining temperature profiles in upper stratosphere from satellite-measured radiances. 542.  
and Raymond M. McInturff. Note on variations in the “quasi-biennial” oscillation. 785.
- MILLER, BANNER I.:  
and Peter P. Chase and Brian R. Jarvinen. Numerical prediction of tropical weather systems. 825.
- MILLER, MARVIN E.:  
and Norman L. Canfield, Terry A. Ritter, and C. Richard Weaver. Visibility changes in Ohio, Kentucky, and Tennessee from 1962 to 1969. 67.
- MISRA, B. M.:  
Planetary pressure wave of 4- to 5-day period in the Tropics. 313.
- MIYAKODA, K.:  
and G. D. Hembree, R. F. Strickler, and I. Shulman. Cumulative results of extended forecast experiments: I. Model performance for winter cases. 836.
- Model output statistics for predicting ceiling height. 869.
- Modification of surface air over Lake Ontario in winter. 662.
- MOGIL, H. MICHAEL:  
and Ronald L. Holle. Anomalous gradient winds: existence and implications. 709.
- Monsoon: heat sources, sinks, and available potential energy generation during southwest monsoon season in Indian region. 383.
- Monthly Weather Review centennial, 1872–1972. 517.
- MORGAN, GRIFFITH M., JR.:  
On the growth of large hail. 196.
- MUKHERJEE, B. K.:  
and Bh. V. Ramana Murty. High-level warmings over a tropical station. 674.

- Multiple regression techniques and inversion of Nimbus “IRIS” observations. 336.
- MURPHY, ALLAN H.:  
Scalar and vector partitions of the ranked probability score. 701.
- MURRAY, F. W.:  
and L. R. Koenig. Numerical experiments on the relation between microphysics and dynamics in cumulus convection. 717.

## N

- NAGLE, R. E.:  
and R. M. Endlich, R. L. Mancuso, and H. Shigeishi. Computation of upper tropospheric reference heights from winds for use with vertical temperature profile observations. 808.
- National Severe Storms Laboratory: radar echo maximum intensity display. 8.
- NELSON, LOREN D.:  
and Bernard A. Silverman. Optimization of warm-cloud seeding agents by microencapsulation techniques. 153.
- NEUMANN, CHARLES J.:  
and John R. Hope. Performance analysis of HURRAN tropical cyclone forecast system. 245.
- Newfoundland: spring ice migration. 690.
- Nocturnal radiation reversal. 354, 357.
- Normals for temperature and precipitation: tests of significance. 503.
- Northern and Southern Hemisphere comparison of autumn stratospheric temperature. 1.
- Northern Hemisphere large-scale circulation—zonal and meridional indices at 700-mb level. 553.
- Note on computational stability of two-step Lax-Wendroff form of advection equation. 72.
- Note on ITCZ wave disturbances and formation of tropical storm Anna. 733.
- Note on kinetic energy spectrum of coastal winds. 671.
- Note on nocturnal radiation reversal. 354.
- Note on theory of topographically forced planetary waves in the atmosphere. 441.
- Note on variations in “quasi-biennial” oscillation. 785.

Notice to authors. 541.  
Nov. 1971 weather and circulation. 171.  
Numerical experiments on relation between microphysics and dynamics in cumulus convection. 717.  
Numerical forecasting models:  
Fleet Numerical Weather Central operational primitive-equation model. 360.  
performance of extended forecast model for winter cases. 836.  
prediction of tropical weather systems. 825.  
reduction of truncation error. 637.  
response of joint ocean-atmosphere model to seasonal variation of solar radiation. 42.  
response of tropical atmosphere and ocean model to seasonally variable forcing. 424.  
Southern Hemisphere prediction with nine-level, primitive-equation model. 625.  
Numerical model:  
efficient, one-level, primitive-equation spectral model. 683.  
growth of large hail in simplified thunderstorm updraft model. 196.  
nocturnal radiation reversal model. 357.  
simulation of precipitation development in supercooled cumuli. 757, 764.  
Numerical solutions of one-dimensional primitive equations using Galerkin approximations. 738.  
Numerical study of effects of Great Lakes on winter cyclone. 374.

## O

Objective analysis accuracy at stratospheric levels. 218.  
Observations of mixed quality and optimum interpolation. 612.  
Ocean-atmosphere model response to seasonal variation of solar radiation. 42.  
Oceanographic and meteorological conditions during the 1970 Bermuda yacht race. 597.  
Oct. 1971 weather and circulation. 74.  
OHRING, GEORGE:  
Application of stepwise multiple regression techniques to inversion of Nimbus "IRIS" observations. 336.  
OLSEN, ROBERT O.:  
and Bruce T. Miers and Elton P. Avara. Short time period atmospheric density variations and determination of density errors from selected rocketsonde sensors. 189.  
Optimization of warm-cloud seeding agents by microencapsulation. 153.  
Optimum interpolation from observations of mixed quality. 612.

## P

Parameterization of ice growth for numerical calculations of cloud dynamics. 417.  
Parameterization of planetary boundary layer for use in general circulation models. 93.  
PARMENTER, FRANCES C.:  
Picture of month—comparison of visible, infrared, and moisture channel data. 318.  
Picture of month—near-simultaneous aircraft and satellite observations over western Canada and northeast Pacific. 168.  
Picture of month—severe weather situation, Mar. 28, 1972. 509.  
Picture of month—ship trails or anomalous cloud lines. 646.  
Picture of month—spring ice migration near Newfoundland. 690.  
and Stanley W. Wright. Picture of month—thin line convection. 880.  
Partitions of the ranked probability score. 701.  
PEASE, STEVEN R.:  
and Walter A. Lyons. Picture of month—"steam devils" over Lake Michigan during January arctic outbreak. 235.

Performance analysis of HURRAN tropical cyclone forecast system. 245.  
Perturbation development in the atmosphere. 145.  
Phenomena observed in southern California stratus. 389.  
PHILLIPS, DAVID W.:  
Modification of surface air over Lake Ontario in winter. 662.  
Picture of month:  
comparison of visible, infrared, and moisture channel data. 318.  
near-simultaneous aircraft and satellite observations over western Canada and northeast Pacific. 168.  
real time ESSA 8 APT tracked over Australia received at Florida over 11,000 mi away. 749.  
severe weather situation, Mar. 28, 1972. 509.  
ship trails or anomalous cloud lines. 646.  
spring ice migration near Newfoundland. 690.  
"steam devils" over Lake Michigan during January arctic outbreak. 235.  
thin line convection. 880.  
turbulent region. 408.  
unusual arcus cloud. 817.  
PIKE, ARTHUR C.:  
Response of tropical atmosphere and ocean model to seasonally variable forcing. 424.

Planetary boundary layer parameterization for general circulation models. 93.  
Planetary pressure wave of 4- to 5-day period in Tropics. 313.  
Planetary variations of stratospheric temperatures. 582.  
Planetary waves: theory of topographical forcing. 441.  
POND, STEPHEN:  
and Daniel E. Frye and William P. Elliott. Note on kinetic energy spectrum of coastal winds. 671.  
Powerline breaks—potential aid in tornado identification and tracking. 307.  
Precipitation and temperature normals: tests of significance. 503.  
Precipitation development in supercooled cumuli: numerical simulation. 757, 764.  
Precipitation forecasting and the polar jet stream. 434.  
Precipitation probabilities reliability estimated from gamma distribution. 607.  
Predicting ceiling heights using model output statistics. 869.  
Prediction of tropical weather systems. 825.  
Pressure wave of 4- to 5-day period in Tropics. 313.  
PRIESTLEY, C. H. B.:  
and R. J. Taylor. On assessment of surface heat flux and evaporation using large-scale parameters. 81.

Primitive equations:  
conservative finite-difference approximations on quasi-uniform spherical grids. 136.  
efficient, one-level, spectral model. 683.  
Fleet Numerical Weather Central operational model. 360.  
forecasting with global, three-layer model. 85.  
solutions using Galerkin approximations. 738.  
Southern Hemisphere prediction model. 625.  
Probability (conditional) for exact, noncategorized initial condition. 796.  
Probability of precipitation: reliability of estimates based on gamma distribution. 607.  
Profiles of wind, divergence, and vertical motion: estimation with approximating polynomials. 345.

## Q

"Quasi-biennial" oscillation variations. 785.  
QUIROZ, RODERICK S.:  
and Melvyn E. Gelman. Direct determination of thickness of stratospheric layers from single-channel satellite radiance measurements. 788.

## R

- Radar echo maximum intensity display at National Severe Storms Laboratory. 8.
- Radar observations from aircraft during 1969 multiple seeding in hurricane Debbie. 208.
- Radiation reversal at night. 354, 357.
- Rainfall: unusually heavy during 24-hr period at Workman Creek 1, Ariz. 206.
- RAJAMANI, S.:  
and K. V. Rao. Study of heat sources and sinks and generation of available potential energy in Indian region during southwest monsoon season. 383.
- RAMANA MURTY, BH. V.:  
and B. K. Mukherjee. High-level warmings over tropical station. 674.
- Random data: distance distributions. 60.
- Ranked probability score: scalar and vector partitions. 701.
- RAO, GANDIKOTA V.:  
and Maurice B. Danard. Numerical study of effects of Great Lakes on winter cyclone. 374.
- RAO, K. V.:  
and S. Rajamani. Study of heat sources and sinks and generation of available potential energy in Indian region during southwest monsoon season. 383.
- Reduction of truncation error in numerical weather prediction models. 637.
- REED, RICHARD J.:  
Further analysis of semidiurnal tidal motions between 30 and 60 km. 579.
- Reference heights: computations of upper tropospheric values from winds. 808.
- Regression technique for temperature profiles in upper stratosphere from satellite-measured radiances. 542.
- Relation between microphysics and dynamics in cumulus convection—numerical experiments. 717.
- Relationship between polar jet stream and heavy precipitation. 434.
- Relationship between lunar tidal cycles and hurricane formation. 451.
- Reliability of precipitation probabilities estimated from gamma distribution. 607.
- RENNER, V.:  
and G. Fischer. Correspondence—comments on “Note on computational stability of two-step Lax-Wendroff form of advection equation.” 682.
- Response of joint ocean-atmosphere model to seasonal variation of solar radiation. 42.
- Response of tropical atmosphere to local, steady forcing. 518.
- RITTER, TERRY A.:  
and Marvin E. Miller, Norman L. Canfield, and C. Richard Weaver. Visibility changes in Ohio, Kentucky, and Tennessee from 1962 to 1969. 67.
- ROBERT, ANDRÉ:  
and John Henderson and Colin Turnbull. Implicit time integration scheme for baroclinic models of the atmosphere. 329.
- Rocketsonde sensors and density errors. 189.

## S

- SADOURNY, ROBERT:  
Conservative finite-difference approximations of primitive equations on quasi-uniform spherical grids. 136.
- SALTZMAN, BARRY:  
and Frank E. Irsch III. Note on theory of topographically forced planetary waves in the atmosphere. 441.
- SASAKI, YOSHIKAZU:  
and Eugene M. Wilkins and Ernest W. Marion. Laboratory simulation of wake effects on second and third thermals in series. 399.
- Satellite determination of global sea-surface temperature distribution. 10.
- Satellite-measured radiances used to determine upper stratosphere temperature profiles. 542.
- Satellite photographs:  
Atlantic hurricane season of 1971. 256.  
Atlantic tropical systems of 1971. 268.  
comparison of visible, infrared, and moisture channel data. 318.  
eastern Pacific hurricane season of 1971. 276.  
evaluation of direct readout infrared data. 117.  
ITCZ wave disturbances and formation of tropical storm Anna. 733.  
meteorological and oceanographic conditions during 1970 Bermuda yacht race. 597.  
near-simultaneous aircraft and satellite observations. 168.  
phenomena observed in southern California stratus. 389.  
real time ESSA 8 APT tracked over Australia. 749.  
severe weather situation, Mar. 28, 1972. 509.  
ship trails or anomalous cloud lines. 646.  
spring ice migration near Newfoundland. 690.  
“steam devils” over Lake Michigan. 235.  
summer thunderstorms over southern California. 799.  
thin line convection. 880.  
turbulent region. 408.
- Satellite radiance measurements for direct determination of stratospheric layer thicknesses. 788.
- Satellite visible, infrared, and moisture channel data compared. 318.
- Scalar and vector partitions of the ranked probability score. 701.
- SCHMIDT, PHILLIP J.:  
and Donald R. Johnson. Use of approximating polynomials to estimate profiles of wind, divergence, and vertical motion. 345.
- SCHULZ, W. A.:  
and D. L. Smith. Weather note—powerline breaks—potential aid in tornado identification and tracking. 307.
- Seasonally variable forcing and response of a tropical atmosphere and ocean model. 424.
- Sea-surface temperature: global distribution determined from a satellite. 10.
- Semiannual variation at the base of the thermosphere. 222.
- Semidiurnal tidal motions between 30 and 60 km. 579.
- SENN, HARRY V.:  
and Peter G. Black and Charles L. Courtright. Airborne radar observations of eye configuration changes, bright band distribution, and precipitation tilt during 1969 multiple seeding experiments in hurricane Debbie. 208.
- Sept. 1972 weather and circulation. 882.
- Severe local storms:  
daily tornado frequencies for contiguous United States. 238, 750.  
damaging, mischievous, and interesting whirlwinds and waterspouts. 317.  
interpretations of chaff trajectories near severe thunderstorm. 653.  
powerline breaks—potential aid in tornado identification and tracking. 307.  
radar echo maximum intensity display at National Severe Storms Laboratory. 8.  
severe weather situation, Mar. 28, 1972. 509.  
summer thunderstorms over southern California. 799.  
unusually heavy 24-hr rainfall at Workman Creek 1, Ariz. 206.
- SHIGEISHI, H.:  
and R. M. Endlich, R. L. Mancuso, and R. E. Nagle. Computation of upper tropospheric reference heights from winds for use with vertical temperature profile observations. 808.
- Ship trails or anomalous cloud lines. 646.
- Short time period atmospheric density variations and determination of density errors from selected rocketsonde sensors. 189.
- SHULMAN, I.:  
and K. Miyakoda, G. D. Hembree, and R. F. Strickler. Cumulative results of extended forecast experiments: I. Model performance for winter cases. 836.

Significance tests for temperature and precipitation normals. 503.

SILVERMAN, BERNARD A.:  
 and Loren D. Nelson. Optimization of warm-cloud seeding agents by microencapsulation techniques. 153.

SIMONS, T. J.:  
 On the theory of atmospheric development. 145.

SIMPSON, JOANNE:  
 Use of gamma distribution in single-cloud rainfall analysis. 309.

SIMPSON, R. H.:  
 and John R. Hope. Atlantic hurricane season of 1971. 256.

Simultaneous aircraft and satellite observations over western Canada and northeast Pacific. 168.

Simultaneous Helmholtz equations: method for solution. 644.

SIRMANS, DALE:  
 and Walter L. Watts. Display of radar echo maximum intensity in use at National Severe Storms Laboratory. 8.

Size distribution of graupel and hail. 325.

SMITH, ARTHUR H., JR.:  
 Picture of month—turbulent region. 408.

SMITH, D. L.:  
 and W. A. Schulz. Weather note—powerline breaks—potential aid in tornado identification and tracking. 307.

SMITH, W. L.:  
 and P. Krishna Rao and R. Koffler. Global sea-surface temperature distribution determined from environmental satellite. 10.

SMITH, WARREN  
 and Russell J. Younkin. Operationally useful relationship between polar jet stream and heavy precipitation. 434.

Snowfall from lake-effect storms. 62.

SOULES, S. D.:  
 and S. Fritz. Planetary variations of stratospheric temperatures. 582.

Southern and Northern Hemisphere comparison of autumn stratospheric temperature. 1.

Southern California stratus cloud phenomena. 389.

Southern Hemisphere circulation climatology from 200-mb GHOST balloon flights. 107.

Southern Hemisphere prediction with nine-level, primitive-equation model. 625.

Spectral model using primitive equations at one level. 683.

Spherical grids for conservative finite-difference approximations of primitive equations. 136.

Stationary mean waves and topographic forcing. 441.

"Steam devils" over Lake Michigan during January arctic outbreak. 235.

STEPHENS, J. J.:  
 Distance distributions for randomly distributed data. 60.

Stratosphere:  
 accuracy of objective analysis at stratospheric levels. 218.  
 determination of thickness of stratospheric layers from single-channel satellite radiance measurements. 788.  
 geostrophic wind deviation in upper troposphere and lower stratosphere in El Paso-White Sands area. 159.  
 high-level warmings over tropical station. 674.  
 planetary variation of temperature. 582.  
 regression technique for determining upper stratosphere temperature profiles from satellite-measured radiances. 542.  
 temperature variations in autumn—Northern and Southern Hemispheres compared. 1.  
 variations in "quasi-biennial" oscillation. 785.

Stratus cloud phenomena in southern California. 389.

STRICKLER, R. F.:  
 and K. Miyakoda, G. D. Hembree, and I. Shulman. Cumulative results of extended forecast experiments: I. Model performance for winter cases. 836.

Subsynoptic scale energy transformations. 126.

Suggestions for authors. 80, 700.

Surface heat flux and evaporation from large-scale parameters. 81.

Surges of maritime tropical air northward over Gulf of California. 298.

T

TAUBENSEE, ROBERT E.:  
 Weather and circulation of Nov. 1971—cool in Northeast in association with development of an east coast trough. 171.  
 Weather and circulation of Feb. 1972—warm and continued dry in Far Southwest. 411.  
 Weather and circulation of July 1972—record cold in Northern Great Plains and Northern Rocky Mountains. 751.

TAYLOR, R. J.:  
 and C. H. B. Priestley. On assessment of surface heat flux and evaporation using large-scale parameters. 81.

Temperature and precipitation normals: tests of significance. 503.

Temperature profile determination in upper stratosphere using satellite-measured radiances. 542.

Temperature profiles at low-altitude: microwave determination. 15.

Temperature structure during 1966 Thanksgiving week air pollution episode in New York City. 445.

Temperature variations in the stratosphere in autumn—Northern and Southern Hemispheres compared. 1.

Temperature variations on planetary scale in stratosphere. 582.

Tests of significance for temperature and precipitation normals. 503.

Theory of atmospheric development. 145.

Thermals: laboratory simulation of wake effects. 399.

Thermosphere base semiannual variation. 222.

THOM, H. C. S.:  
 and Marcella D. Thom. Tests of significance for temperature and precipitation normals. 503.

THOM, MARCELLA D.:  
 and H. C. S. Thom. Tests of significance for temperature and precipitation normals. 503.

Thunderstorm: nearby chaff trajectories. 653.

Thunderstorm model and hail. 196.

Thunderstorms in summer over southern California. 799.

Tidal motions of semidiurnal period between 30 and 60 km. 579.

Time integration scheme for baroclinic models. 329.

Time integrations using a frequency filter. 487.

Topographically forced planetary waves. 441.

Tornadoes:  
 daily frequencies for contiguous United States. 238, 750.  
 powerline breaks as an aid in identification and tracking. 307.

Trajectories of chaff near severe thunderstorm. 653.

Transformation of subsynoptic scale energy. 126.

Transport estimates and wind fields from a network of wind towers. 565.

Transport of atmospheric energy over North America for 3 winter mo. 491.

Tropical atmosphere and ocean model response to seasonally variable forcing. 424.

Tropical atmosphere response to local, steady forcing. 518.

Tropical cyclone forecast system performance. 245.

Tropical cyclone model: development of asymmetries in three-dimensional numerical model. 461.

Tropical depression produces record rains, Sept. 20-23, 1969. 294.

Tropical storms:  
 Atlantic tropical systems of 1971. 268.  
 formation of Anna. 733.

Tropical weather system prediction. 825.

Tropics:  
 high-level warmings over tropical station. 674.  
 ITCZ wave disturbances and formation of tropical storm Anna. 733.  
 planetary pressure wave of 4- to 5-day period. 313.

Tropospheric reference heights: computation of high-level values from winds. 808.

Truncation error reduction in numerical weather prediction models. 637.

TUBBS, ANTHONY M.:  
 Summer thunderstorms over southern California. 799.

TURNBULL, COLIN:  
and André Robert and John Henderson. Implicit time integration scheme for baroclinic models of the atmosphere. 329.  
Two-level, quasi-geostrophic, atmosphere model with diabatic heating. 477.

V

VANDERMAN, LLOYD W.:  
Forecasting with global, three-layer, primitive-equation model. 856.  
Variations in "quasi-biennial" oscillation. 785.  
Vertical temperature structure during 1966 Thanksgiving week air pollution episode in New York City. 445.  
Vertically integrated liquid water—new analysis tool. 548.  
Visibility changes in Ohio, Kentucky, and Tennessee, 1962–69. 67.  
VUKOVICH, F. M.:  
and C. F. Chow and E. C. Kindle. Study of atmospheric behavior using quasi-geostrophic, diabatic, two-level model. 477.

W

WAGNER, A. JAMES:  
Weather and circulation of Jan. 1972—month with record strong midlatitude westerlies. 322.  
Weather and circulation of Apr. 1972—highly variable over Central and Eastern United States, continued drought in the Southwest. 590.  
Weather and circulation of June 1972—month with two major flood disasters. 692.  
Weather and circulation of Sept. 1972—another Aug.–Sept. reversal. 882.  
WAHL, EBERHARD W.:  
Climatological studies of large-scale circulation in Northern Hemisphere: I. Zonal and meridional indices at 700-mb level. 553.  
Wake effects on second and third thermals in series. 399.  
WANG, HSUAN-HENG:  
and Paul Halpern, Jim Douglas, Jr., and Todd Dupont. Numerical solutions of one-dimensional primitive equations using Galerkin approximations. 738.  
Warm-cloud seeding agents: optimization by microencapsulation. 153.  
Waterspouts and whirlwinds. 317.  
WATTS, WALTER L.:  
and Dale Sirmans. Display of radar echo maximum intensity in use at National Severe Storms Laboratory. 8.  
Waves breaking at an inversion. 133.  
Weather note:  
minimal tropical depression produces record rains. 294.  
powerline breaks—potential aid in tornado tracking. 307.  
unusually heavy 24-hr rainfall at Workman Creek 1, Ariz. 206.  
Weather, U.S.:  
continued drought in Southwest, Apr., May 1972. 590, 648.  
minimal tropical depression produces record rains. 294.  
monthly résumés Oct. 1971–Sept. 1972. 74, 171, 239, 322, 411, 511, 590, 648, 692, 751, 819, 882.  
phenomena in southern California stratus. 389.  
severe weather situation, Mar. 28, 1972. 509.  
"steam devils" over Lake Michigan during January arctic outbreak. 235.  
two major flood disasters in June 1972. 692.

WEAVER, C. RICHARD:  
and Marvin E. Miller, Norman L. Canfield, and Terry A. Ritter. Visibility changes in Ohio, Kentucky, and Tennessee from 1962 to 1969. 67.  
WEBSTER, PETER J.:  
Response of tropical atmosphere to local, steady forcing. 518.  
WENDELL, LARRY L.:  
Mesoscale wind fields and transport estimates determined from network of wind towers. 565.  
WESTWATER, ED R.:  
Ground-based determination of low altitude temperature profiles by microwaves. 15.  
WETHERALD, RICHARD T.:  
and Syukuro Manabe. Response of joint ocean-atmosphere model to seasonal variation of solar radiation. 42.  
Whirlwinds and waterspouts. 317.  
WILKINS, EUGENE M.:  
and Yoshikazu Sasaki and Ernest W. Marion. Laboratory simulation of wake effects on second and third thermals in series. 399.  
WILLIAMS, GARETH P.:  
Field distributions and balances in baroclinic annulus wave. 29.  
Wind deviation in upper troposphere and lower stratosphere in El Paso–White Sands area. 159.  
Wind tower network: mesoscale wind fields and transport estimates. 565.  
Winds:  
anomalous gradient values. 709.  
coastal kinetic energy spectrum. 671.  
WINNINGHOFF, FRANCIS J.:  
and Philip G. Kesel. Fleet Numerical Weather Central operational primitive-equation model. 360.  
Winter cyclones and Great Lakes effects. 374.  
WOOLDRIDGE, GENE L.:  
Effects of internal gravity waves on energy budgets and vertical transport of angular momentum over mountainous terrain. 177.  
WOOLF, HAROLD M.:  
and Melvyn E. Gelman and Alvin J. Miller. Regression technique for determining temperature profiles in upper stratosphere from satellite-measured radiances. 542.  
WRIGHT, STANLEY W.:  
and Frances C. Parmenter. Picture of month—thin line convection. 880.  
WU, HSING-WU:  
and Kenneth H. Jehn. Geostrophic wind deviation in upper troposphere and lower stratosphere in El Paso–White Sands area. 159.  
WURTELE, M. G.:  
and J. G. Edinger. Interpretation of some phenomena observed in southern California stratus. 389.

Y

YOUNKIN, RUSSELL J.:  
and Warren Smith. Operationally useful relationship between polar jet stream and heavy precipitation. 434.

Z

Zonal and meridional indices at 700-mb level in Northern Hemisphere. 533.