Journal Base

This is a summary of thirty four articles identified in the study and organized from recent to past (2002-1984). Following this document is the *bib_list* that contains only the citation for each article. The format for each is title, author(s), date published, publication, volume, number, and page numbers. Articles were searched on the AMS journal archive for keyword "microburst." The journal base was obtained to compare/contrast microburst knowledge of research and operations.

*****2002**

Microburst Detection Using Agent Networks. Dance, Sandy, Rodney Potts, 2002. *Journal of Atmospheric and Oceanic Technology*: Vol. 19, No. 5, pp. 646–653.

- Based on an event in Australia in September of 1999.
- Provides brief explanation of microbursts and radar characteristics.
- Purpose is to detect/forecast microbursts using agent networks (networks that work together to interpret radar data).
- Radar data is split up into sections/agents in order to study specific characteristics.
- Agents are identified through: read data (radar data is sent and interpreted), shear detector, microburst detector, and microburst tracking.
- Experimental results of the agent networks on a storm in Australia.

*****2001**

Simple Adjoint Retrievals of Wet Microburst Winds and Gust Front Winds from Single-Doppler Radar Data. Xu, Qin, Hongdao Gu, Chongjian Qiu, 2001. *Journal of Applied Meteorology*: Vol. 40, No. 8, pp. 1485–1499.

- Method used to retrieve low altitude winds.
- Methods of study and modifications of the 1995 simple adjoint experiment.
- Radar data for wet microburst and gust front winds include cross beam tangential winds and sine alpha fields.
- Retrieval errors and explanation.

*****1996**

Structure and Evolution of a Long-Lived, Microburst-Producing Storm. Knupp, Kevin R., 1996. *Monthly Weather Review*: Vol. 124, No. 12, pp. 2785–2806.

- Study of a storm in central Colorado on 4 August 1997.
- Discussion of the kinematic aspects of the storm.

- Analysis of environmental conditions with storm life cycle.
- Doppler analyses of storm thermodynamics and kinematics with: airflow patterns, trajectory analysis, saturation point analysis, and rotor circulation.

ELDORA Observations during VORTEX 95. Wakimoto, Roger M., Lee, Wen-Chau, Bluestein, Howard B., Liu, Ching-Hwang, Hildebrand, Peter H. 1996. *Bulletin of the American Meteorological Society.* Vol. 77, No. 7, pp. 1465–1481.

- New radar developed by NCAR and Centre de Rechereche en Physique de l'Environment Terrestre et Planetaire.
- ELDORA's description and examples of it performance during VORTEX (Verifications of the Origins of Tornadoes Experiment).
- RHI plots of clear air, dry lines and convective plumes, and low reflectivity microburst.
- Low reflectivity microburst occurred in the panhandle of Texas on April 30th.
- Virga shaft with blowing dust suggest that it was a dry microburst event.

A Three-Dimensional Numerical Analysis of Colliding Microburst Outflow Dynamics. Orf, Leigh G., John R. Anderson, Jerry M. Straka, 1996. *Journal of the Atmospheric Sciences*: Vol. 53, No. 17, pp. 2490–2511.

- A parameter study of colliding microbursts to educate pilots of the danger of microburst activity.
- In-depth analysis of model and method of mathematical representation.
- The model is completely dry with no microphysical characteristics in order to study "only the kinematics."
- Model results for isolated microburst and colliding microbursts.
- The F factor is introduced which is an aircraft hazard parameter.
- Trajectory analysis used to study northward flowing elevated jet between microbursts.
- Lagrangian analysis of parcel in elevated jet.
- High pressure dome is primarily responsible for producing the jet.

Least Squares Retrieval of Microburst Winds from Single-Doppler Radar Data. Qiu, Chong-Jian, Qin Xu, 1996. *Monthly Weather Review*: Vol. 124, No. 6, pp. 1132–1144.

- Least Squares (LS) method is a mathematical method to study low altitude radar wind retrievals.
- The LS method is compared to the Simple Adjoint method (SA).
- The method is performed using the same data collected by Xu et al. 1995.

- Six experiments were used to test the method to test data at various time intervals.
- LS method is more reliable in this study than the SA method.

*****1995**

Microburst Rotation: Simulations and Observations. Rinehart, Ronald E., Alan Borho, Charles Curtiss, 1995. *Journal of Applied Meteorology*: Vol. 34, No. 6, pp. 1267–1285.

- The study is based upon 908 cases in and around the Orlando, FL area.
- Discussion of mathematical theory and derivation used with characteristics that can be identified on radar (flow fields).
- Brief focus on the 6 July and 22 July1992 storms with radar imagery.
- Focus on radar range, azimuth data, and differential velocity measurements.
- Graphics of simulated and observed cases for the specified storms.
- Discussion and radar imagery for the 6 July event that produced two rotating microbursts.
- Parameters used in simulations available in table of three microburst cases.
- Mathematical discussion of microburst source and rotation strength.
- Table of radar data for numerous storms with average of 908 cases.
- Compare/contrast discussion of observed and simulated discussed.

Simple Adjoint Retrievals of Microburst Winds from Single-Doppler Radar Data. Xu, Qin, Chong-Jian Qiu, Hong-Dao Gu, Jin-Xiang Yu, 1995. *Monthly Weather Review*: Vol. 123, No. 6, pp. 1822–1833.

- The simple adjoint (SA) method is used to study low altitude winds.
- The SA method was used on storms in the Denver area.
- Description of model and three experiments discussed and analyzed with tables and equations.

Single-Doppler Velocity Retrievals with Phoenix II Data: Clear Air and Microburst Wind Retrievals in the Planetary Boundary Layer. Shapiro, Alan, Scott Ellis, Justin Shaw, 1995. *Journal of the Atmospheric Sciences*: Vol. 52, No. 9, pp. 1265–1287.

- Three dimensional radar wind retrieval experiments near Boulder, CO.
- In-depth mathematical explanation of velocity retrievals.
- Velocity constraints with mathematical discussion.
- In-depth discussion of retrievals from clear air boundary layer.
- Moderate reflectivity microburst 31 May 1984 retrievals during experiments.
- Analyses of experiments run with constraints (4 separate) with data tables.

*****1994**

WINDEX- A New Index for Forecasting Microburst Potential. McCann, Donald W., 1994. *Weather and Forecasting*: Vol. 9, No. 4, pp. 532–541.

- Microburst forecasting tool derived from sounding information.
- Brief discussion of equation and derivation of WINDEX.
- Table with WINDEX information from several wet/dry event days.
- Paper focuses one 1985 Dallas Fort Worth, TX (DFW) case plus three days in August 1993.
- Sounding and surface analysis for DFW case.
- Discussion of microburst formation from residual outflow boundary.

*****1993**

Numerical Simulations of Microburst-Producing Storms: Some Results from Storms Observed during COHMEX. Straka, Jerry M., John R. Anderson, 1993. *Journal of the Atmospheric Sciences*: Vol. 50, No. 10, pp. 1329–1348.

- Three-dimensional model of microburst producing storm using morning soundings.
- Sounding and hodograph information and average characteristics.
- Discussion of development, microphysical, thermodynamic, and kinematic evolution of a simulated storm.
- Brief discussion of possible microburst precursors.
- 20 July 1986 storm studied in-depth with model.
- Complete analysis of storm with mathematical description of downdraft forcing (microphysical).

*****1992**

The Evolution and Structure of a "Bow-Echo–Microburst" Event. Part I: The Microburst. Lee, Wen-Chau, Richard E. Carbone, Roger M. Wakimoto, 1992. *Monthly Weather Review*: Vol. 120, No. 10, pp. 2188–2210.

- Single cell storm study on 14 July 1982 over the Joint Airport Weather Study (JAWS) network near Denver, CO.
- The study is primarily focused on thermodynamics and kinematics.
- Brief discussion on synoptic forcing and pre-existing environmental conditions.
- Radar analysis techniques with multi radar characteristics table.
- Discussion of one-dimensional model with numerical downdraft and precipitation loading. Model results (thermo/microphysical) with trajectory analysis using three-dimensional wind field.
- Description of evolution of storm updraft, transition, and microburst stages.

The Evolution and Structure of a "Bow-Echo Microburst" Event. Part II: The Bow Echo. Lee, Wen-Chau, Roger M. Wakimoto, Richard E. Carbone, 1992. *Monthly Weather Review*: Vol. 120, No. 10, pp. 2211–2225.

- Study of 14 July 1982 event during Joint Airport Weather Study (JAWS) in Colorado.
- Part II of this study focuses on the vorticity of storm that caused the formation and evolution of the bow echo.
- In-depth bow echo evolution discussion with numerous graphics.
- Conceptual model single-cell event is drawn from event analysis.

*****1991**

Wet Microburst Activity over the Southeastern United States: Implications for Forecasting. Atkins, Nolan T., Roger M. Wakimoto, 1991. *Weather and Forecasting*: Vol. 6, No. 4, pp. 470–482.

- Focus on thermodynamic properties and environmental conditions with summer thunderstorms over the southeast US.
- Discussion of thermodynamic properties/environment during microburst days, days with thunderstorms but no microburst, and non-thunderstorm days (table included within the paper).
- Correlation between data is trying to be achieved to aid forecasters to create a more reliable forecast for wet microburst activity.
- Discussion of theta aloft, storm structure, and synoptic conditions.

Kinematic, Dynamic, Thermodynamic, Analysis of a Weakly Sheared Severe Thunderstorm over Northern Alabama. Kingsmill, David E., Roger M. Wakimoto, 1991. *Monthly Weather Review*: Vol. 119, No. 2, pp. 262-297.

- Study of 20 July 1986 event over Northern Alabama.
- Complete analysis of storm morphology including vertical cross-section photographs with superimposed winds, reflectivity, and buoyancy within the storm at each stage.
- Skew-T, vertical profiles of horizontal divergence, reflectivity, and vertical velocity.
- Discussion of the storm's constriction during convergence stage and microburst produced.
- Conceptual model.

The Evolution and Fine-Scale Structure of a Microburst Producing Cell. Mahoney, William P., Kimberly L. Elmore, 1991. *Monthly Weather Review*: Vol. 119, No. 1, pp. 176–192.

- 17 July 1987 event in eastern Colorado.
- Environment, thermodynamics, and kinematic characteristics of storm.
- Storm produced two microbursts within five kilometers of each other.
- Kinematic and trajectory analyses are fully discussed for both microbursts.

*****1990**

Judgment and Decision Making in Dynamic Tasks: The Case of Forecasting Microbursts. Lusk, Cynthia M., Thomas R. Stewart, Kenneth R. Hammond, Rodney J. Potts, 1990. *Weather and Forecasting*: Vol. 5, No. 4, pp. 627–639.

- Two tests of forecasters' ability to predict microbursts.
- First test based upon forecasters receiving known precursor values.
- Second test based on their usual forecast setting and process.
- The first test proved to be the best.
- In-depth analysis of the formation of experiment and also results/variables.
- Tables available for understanding study.

The 700–500 mb Lapse Rate as an Index of Microburst Probability: An Application for Thermodynamic Profilers. Caplan, S.J., A.J. Bedard, M.T. Decker, 1990. *Journal of Applied Meteorology*: Vol. 29, No. 8, pp. 680–687.

- Thermodynamic base study of 700-500mb lapse rates comparing rawinsonde data with the thermodynamic profiler in the Denver area.
- Used to help as a forecasting tool for dry microburst events
- Lapse rates were taken during non-event days to confirm 700-500mb layer played a role in the occurrence of microbursts.
- Concluded microburst occurrence is better in afternoon because of daytime heating in the PBL.

Dynamics and Fine Structure of a Microburst. Parsons, David B., Robert A. Kropfli, 1990. *Journal of the Atmospheric Sciences*: Vol. 47, No. 13, pp. 1674–1674.

- Moderate reflectivity microburst 31 May 1984 located in eastern Colorado.
- Focuses on Dual Doppler data for study.
- Environmental conditions with surface and upper air charts.
- Skew-T and hodographs along with several profiles.

- Discussion using the radar storm evolution and a look at the horizontal eddy field.
- Mathematical explanation of the thermodynamic variables studied.
- Discussion of results with graphics of parameters.
- Mathematical analysis of thermodynamic parameters.

*****1989**

Environmental Conditions Associated with the Dallas Microburst Storm -Determined from Satellite Soundings. Ellrod, Gary, 1989. *Weather and Forecasting*: Vol. 4, No. 4, pp. 469–484.

- 2 August 1985 Dallas Fort Worth, TX (DFW) aircraft incident.
- Author considers event to be between a wet and dry event.
- Focus is on the thermodynamic variables.
- Environmental conditions with synoptic setting are discussed with regard to 500mb and surface charts.
- Satellite imagery from Visible Atmospheric Sounder aboard GOES.
- Discussion and maps on lifted index, lapse rates, precipitable water, and theta-e in and around the DFW area.
- Air mass analysis, vertical energy profile, and surface forcing mechanisms discussion with graphics.

Observational and Numerical Study of a Microburst Line-Producing Storm. Hjelmfelt, M.R., R.D. Roberts, H.D. Orville, J.P. Chen, F.J. Kopp, 1989. *Journal of the Atmospheric Sciences*: Vol. 46, No. 17, pp. 2731–2744.

- 13 July 1982 event near Denver, CO.
- Brief mesoscale environment and storm structure discussion using 500 and 700mb charts and Skew-T.
- Discussion of line and kinematic parameters with storm track.
- Aircraft measurements within storm.
- Two-dimensional time-dependent model to study storm with in-depth analysis of primarily thermodynamic and kinematic results with graphics.
- Mathematical explanation of forcing effects.

Numerical Simulations of an Isolated Microburst. Part II: Sensitivity Experiments. Proctor, Fred H., 1989. *Journal of the Atmospheric Sciences*: Vol. 46, No. 14, pp. 2143–2165.

- Evaluation of how a microburst-producing storm reacts to various environmental conditions (e.g., ground based stable layer, precipitation loading, radius, and type).
- Analysis with tables and graphics to show sensitivity of model.
- Brief examination of the effect of rotation and vortex interactions on microbursts.
- Contrast of wet and dry events and index for wet microburst potential.

A Proposed Microburst Nowcasting Procedure Using Single-Doppler Radar. Roberts, Rita D., James W. Wilson, 1989. *Journal of Applied Meteorology*: Vol. 28, No. 4, pp. 285–303.

- A study of thirty-one microburst events in Colorado.
- Radar analysis of downdraft mechanisms including: thermal buoyancy, evaporative cooling, vertical pressure gradient, and precipitation drag.
- Varying physical mechanisms of low, moderate, and high reflectivity.
- Forecaster-computer hints to forecast events.

Multiparameter Radar Study of a Microburst: Comparison with Model Results. Tuttle, John D., V.N. Bringi, H.D. Orville, F.J. Kopp, 1989. *Journal of the Atmospheric Sciences*: Vol. 46, No. 5, pp. 601–620.

- 20 July 1986 event over Northern Alabama.
- Environmental conditions with evolution of storm and causes for growth and development with radar information (Range Height Indicator and Plan Position Indicator plots of evolution).
- Two-dimensional time-dependent model used to study storm.
- Results with comparison to radar observations.

*****1988**

Numerical Simulations of an Isolated Microburst. Part I: Dynamics and Structure. Proctor, Fred H., 1988. *Journal of the Atmospheric Sciences*: Vol. 45, No. 21, pp. 3137–3160.

- Simulation runs for Denver 30 June 1982 and Dallas Fort Worth, TX (DFW) 2 August 1985 events.
- Description of studies already completed and description of model used.

- Environmental conditions with storm evolution and structure.
- Thermodynamics, kinematic, and microphysical discussions.
- In the DFW case, simulation results compared to flight recorder data.
- Results of evolution and structure of each event.

A Kinetic Energy Analysis of a Microburst-Producing Thunderstorm Based on JAWS Dual-Doppler Data. Lin, Yeong-jer, John A. Coover, 1988. *Journal of the Atmospheric Sciences*: Vol. 45, No. 19, pp. 2764–2771.

- Dry microburst 14 July 1982 in Colorado at mature stage.
- Mathematical explanation of procedures used in the study.
- Results with table to summarize the data.
- Data includes: horizontal divergence, vertical flux divergence, and their generation.

Structure and Life Cycle of Microburst Outflows Observed in Colorado. Hjelmfelt, Mark R., 1988. *Journal of Applied Meteorology*: Vol. 27, No. 8, pp. 900–927.

- Focus on kinematics of microburst outflows.
- The study includes twenty-six cases from the Joint Airport Weather Study (JAWS) network from 1982.
- Isolated and line-associated microburst discussion.
- Comparison and contrast of these two event types.
- Complete radar and schematic representation of literature.

*****1987**

Structural Features of a Microburst-Producing Storm in Colorado Revealed by JAWS Dual-Doppler Radars. Lin, Yeong-Jer, Robert Hughes, 1987. *Journal of the Atmospheric Sciences*: Vol. 44, No. 24, pp. 3640–3655.

- Study of 14 July 1982 event in Colorado.
- Discussion of synoptic environment with main focus on dynamics and thermodynamics of storm.
- Mathematical discussion of procedures used.
- Analysis of results such as reflectivity, storm-relative winds, pressure deviation, vertical acceleration, and rain loading.
- Vertical cross-sections and horizontal images at 0.25 and 4 kilometers in storm.

Aircraft Measurements on Microburst Development from Hydrometeor Evaporation. Mahoney, William P., Alfred R. Rodi, 1987. *Journal of the Atmospheric Sciences*: Vol. 44, No. 20, pp. 3037–3051.

- 1982 Joint Airport Weather Study (JAWS) network study and University of Wyoming King Air research aircraft studied kinematic, thermodynamic, and microphysical characteristics of microburst producing showers (non cumulonimbus).
- Four cases total were studied (3 microburst producing storms).
- Discussions of aircraft pass locations and data acquired from each pass (particle distribution).
- Evaporation and downdraft model discussion with comparison of calculated and observed values.
- Discussion of non-event environmental conditions.
- 14 July event was the only storm to have precipitation reach the ground and therefore considered a wet microburst.

Analysis of a Microburst in the FACE Meteorological Mesonetwork in Southern Florida. Caracena, Fernando, Michael W. Maier, 1987. *Monthly Weather Review*: Vol. 115, No. 5, pp. 969–985.

- Study of 1 July 1975 event in southern Florida.
- Main focus on thermodynamic and kinematic aspects of the storm.
- Brief discussion of past experiments and knowledge of wet and dry events.
- Skew-T, surface conditions, and upper air charts (mesoscale features).
- Discussion of dry air aloft in Skew-T and mesoscale pattern during the day.
- Meso-analysis of storm.
- Description of results for surface wind, rain, and downburst mechanisms.
- Storm evolution discussion of the “spearhead echo.”
- Discussion of why wet microbursts are difficult to forecast and situations and parameters identified in the study.

*****1986**

A High Resolution Spatial and Temporal Multiple Doppler Analysis of a Microburst and its Application to Aircraft Flight Simulation. Elmore, K.L., J. McCarthy, W. Frost, H.P. Chang, 1986. *Journal of Applied Meteorology*: Vol. 25, No. 10, pp. 1398–1425.

- Doppler analysis from the Joint Airport Weather Study (JAWS) network in Colorado to study three-dimensional wind patterns associated with microbursts.
- Studies were incorporated into a flight simulator to study effects of parameters on an airplane.

- Time series of horizontal and vertical cross-sections of winds and reflectivity of a particular microburst studied with discussion of each graphic.
- Flight simulator and results.
- Take-off and landing examples used in the simulator with graphics.

*****1985**

Forecasting Dry Microburst Activity over the High Plains. Wakimoto, Roger M., 1985. *Monthly Weather Review*: Vol. 113, No. 7, pp. 1131–1143.

- Moderate reflectivity microburst on 31 May 1984 in eastern Colorado during the Phoenix II experiment.
- Focus on Dual Doppler radar data from storm.
- Environmental conditions with surface and upper air charts.
- Skew-T with hodograph, mixing ratio, and potential temperature profile graphic.
- Microburst evolution from radar data such as: horizontal and vertical perturbation wind field and horizontal eddy field.
- Mathematical explanation of the thermodynamic variables studied and retrieved.
- Results with graphics of theta-v, vertical velocity, and others.
- Mathematical study of thermodynamic parameters.

A Simple Model of Evaporatively Driven Downdraft: Application to Microburst Downdraft. Srivastava, R.C., 1985. *Journal of the Atmospheric Sciences*: Vol. 42, No. 10, pp. 1004–1023.

- A one-dimensional time-dependent model to study high based cumulus downdraft.
- Focuses on microphysical, thermodynamic, and kinematic aspects of event.
- In-depth mathematical explanation of equations used in model.
- Studies include specified parameters (e.g., mixing, no mixing).

*****1984**

Microburst Wind Structure and Evaluation of Doppler Radar for Airport Wind Shear Detection. Wilson, James W., Rita D. Roberts, Cathy Kessinger, John McCarthy, 1984. *Journal of Applied Meteorology*: Vol. 23, No. 6, pp. 898–915.

- Doppler radar used to study horizontal and vertical components of wind associated with Joint Airport Weather Study network microburst studies.
- Time series of 14 July 1982 event is discussed with flow field graphics.
- Table of events of low-level wind shear values.
- Table of cases with differential velocity, temperature change, and reflectivity.

- Brief discussion on forecasting microbursts.
- Doppler radars (single and dual) on and off airport locations and what the radars need to detect for nowcasting/forecasting microbursts.
- Example of an off airport radar with detected wind field and reflectivity.

A publication (or report) of the University of Louisiana at Monroe pursuant to an Outreach Program Agreement with the University Corporation for Atmospheric Research and pursuant to National Oceanic and Atmospheric Administration Award No. NA17WD2383. Preliminary Investigation of Observed Microburst Characteristics and Forecasting Methods.