Notes on Analysis and Severe-Storm Forecasting Procedures of the Air Force Global Weather Central

Authors: Robert C. Miller; AIR WEATHER SERVICE SCOTT AFB IL

...discusses the various types of severe-weather air masses, how severe weather systems form, which parameters best define the existence and intensity of severe weather, and how to use local information to better forecast the various stability indexes are presented. Also, a chapter on severe weather in tropical air masses is included. A number of detailed ...material concentrates on the application of computer-derived aids to severe weather forecasting produced by the Air Force Global Weather ...Foremost among these aids are analyses and prognoses of the Severe Weather Threat (SWEAT) Index.

The 1859 Solar-Terrestrial Disturbance and the Current Limits of Extreme Space Weather Activity

Authors: E. W. Cliver; L. Svalgaard; AIR FORCE RESEARCH LAB HANSCOM AFB MA SPACE WEATHER CENTER OF EXCELLENCE

It is generally appreciated that the September 1859 solar-terrestrial disturbance, the first recognized space weather event, was exceptionally large. How large and how exceptional? To answer these questions, we compiled rank ...auroral extent. While the 1859 event has close rivals or superiors in each of the above categories of space weather activity, it is the only documented event of the last "150 years that appears at or near the top of all of the lists. Taken together, the top-ranking events in each of the disturbance categories comprise a set of benchmarks for extreme space weather activity.

AN INTRODUCTION TO WEATHER MODIFICATION

Authors: Herbert S. Appleman; AIR WEATHER SERVICE SCOTT AFB IL

Weather modification techniques are explained and Air Weather Service activities in cloud-seeding and fog-dissipation experiments are discussed.

Computer Models Used by AFGWC and NMC for Weather Analysis and Forecasting

Authors: Richard J. Conklin; AIR FORCE GLOBAL WEATHER CENTRAL OFFUTT AFB NE

Describes the numerical analysis and forecast models most widely used by U.S. Air Force meteorologists. These models are: the Air Force Global Weather Central (AFGWC) Global Spectral Model (GSM) the AFGWC Real-Time Nephanalysis (RTNEPH); the AFGWC High Resolution Analysis (HIRAS) models; the ...the grids are built. Strengths and weaknesses of the various models are discussed, along with AFGWC and NMC production cycles. Meteorology, Weather, Forecasting, Computers, Supercomputers, Computer programs, Models, Analysis, Computer analysis, Numerical analysis, Cray, Grids, Resolution, Topography, Map ...

Weather Tutor I: Stability Basics

Authors: AIR WEATHER SERVICE KEESELER AFB MS DETACHMENT 5

This is the first in a series of computer-based interactive packages produced by Air Weather Service for use by Air Force weather units. It consists of text (instructions for running and using the computer program) and three 3 1/2-inch diskettes containing program software that generate high-resolution graphic images, animation, and text. The training package is in three parts: the first familiarizes students with the relationships between atmospheric variables. The second ...

The Basics of Weather Models

Authors: W. D. Meyer; AIR WEATHER SERVICE SCOTT AFB IL

Without using mathematics, this memo summarizes the important information weather forecasters need to know to apply numerical weather prediction (NWP) forecasts. We've had to make some tough choices regarding what material to include. We've put the more technically rigorous information in an appendix; readers can review this material as they have time. We've organized the material under three main topics: History of NWP; Components of an NWP model; Strengths and weaknesses of NWP models—what these models can and cannot do.
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Date</th>
<th>Pages</th>
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<tr>
<td>Air Weather Service Weather-Modification Program (FY 1971)</td>
<td>Herbert S. Appleman; Laurence D. Mendenhall; John C. Lease; Robert I. Sax</td>
<td>Apr 1972</td>
<td>33</td>
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<td>The annual report on the weather-modification activities of the Air Weather Service discusses the techniques, procedures, and results of the projects undertaken during FY 1971. Its primary purpose is to inform AWS field personnel on the weather-modification progress enjoyed during the year. Detailed reports of the individual projects are published elsewhere when warranted. COLD WAND, COLD FLAKE, COLD COWL, COLD CRYSTAL, WARM FOG, and COLD RAIN are the activities covered in this report.</td>
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<td>Catalog of Air Force Weather Technical Documents 1941-2000</td>
<td>AIR FORCE WEATHER TECHNICAL LIBRARY ASHEVILLE NC</td>
<td>Sep 2000</td>
<td>167</td>
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<td>This catalog lists unclassified technical documents produced by or for the Air Force Weather Agency and its subordinate units from 1941 through 2000. Documents listed include: technical reports, technical notes, data summaries, project reports, special studies, and forecaster memos, along with availability data and ordering instructions.</td>
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<td>Catalog of Air Force Weather Technical Documents, 1941-2006</td>
<td>Gary Swanson; AIR FORCE WEATHER TECHNICAL LIBRARY ASHEVILLE NC</td>
<td>May 19, 2006</td>
<td>182</td>
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<td>This catalog lists unclassified technical documents produced by or for the Air Force Weather Agency and its subordinate units from 1941 through 2000. Documents listed include: technical reports, technical notes, data summaries, project reports, special studies and forecaster memos along with availability data and ordering instructions.</td>
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<td>An Analysis of Preflight Weather Briefings</td>
<td>O. V. Prinzo; Alfred M. Hendrix; Ruby Hendrix; FEDERAL AVIATION ADMINISTRATION OKLAHOMA CITY OK CIVIL AEROMEDICAL INST</td>
<td>Feb 2007</td>
<td>24</td>
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<td>... aviation (GA) accidents and mishaps. The type of weather information requested from, or provided, by automated flight service station (AFSS) specialists is dependent on weather conditions at the time the preflight briefing occurs. However ... the purpose of this research was to document the types of AFSS weather information that GA pilots requested and received ... the weather conditions at the departure, en route, and destination point. ... the weather conditions (clouds) in addition to any other weather conditions that might prove to be significant during a ...</td>
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<td>In Every Clime and Place: USMC Cold Weather Doctrine</td>
<td>Jerry L. Durrant; ARMY COMMAND AND GENERAL STAFF COLL FORT LEAVENWORTH KS SCHOOL OF ADVANCED MILITARY STUDIES</td>
<td>Dec 16, 1991</td>
<td>52</td>
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<td>... and training base for operations in a cold weather environment. Based on its reinforcement mission ... plan to establish a doctrinal basis for cold weather operations, integrate a training and exercise ... clothe and equip. The methodology of this cold weather doctrine and training review is to examine ... link to current Marine Corps cold weather doctrine. Second, this paper reviews the historical ... Third, it provides an analysis of existing cold weather tactical doctrine utilizing the functions and ... second part of the analysis evaluates cold weather training doctrine using the operational priorities ...</td>
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<td>The Role of Weather in Class A Naval Aviation Mishaps by FY90-98</td>
<td>Ruben A. Cantu; NAVAL POSTGRADUATE SCHOOL MONTEREY CA</td>
<td>Mar 2001</td>
<td>103</td>
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<td>... FY 98 are analyzed for the possibility of being weather related. In addition to determining the overall role ... 19% of mishaps involving aircrew error are weather related with helicopter category and controlled ... mishap characteristic having the largest percent of weather related mishaps for their respective groupings ... elements account for over half of all weather related mishaps, and nearly two-thirds ... mishaps were judged to be preventable with a perfect weather forecast believed by aircrew. These and ... develop intervention strategies for reducing the number of weather related flight mishaps (FMs) per ...</td>
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<td>Benign Weather Modification</td>
<td>Barry E. Coble; AIR UNIV MAXWELL AFB AL SCHOOL OF ADVANCED AIRPOWER STUDIES</td>
<td>Jun 1, 1996</td>
<td>61</td>
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<td>... peacetime missions. However, interest in the ability to modify weather has waned over recent years and ... This study examines one aspect of weather modification, benign weather modification, for possible use ... After briefly reviewing the history and science of weather modification, this study bounds the aspects ... study then describes barriers to benign weather modification (BWM), showing how they affect ... use by the military, and some military-unique needs for weather modification. After examining current ... should conduct a more in-depth review of weather modification to see if technological advances ...</td>
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<td>Benign Weather Modification</td>
<td>Barry B. Coble; AIR UNIV MAXWELL AFB AL</td>
<td>May 1997</td>
<td>43</td>
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<td>... peacetime missions. However, interest in the ability to modify weather has waned over recent years and ... study examines one aspect of weather modification, benign weather modification (BWM), for possible ... ... After briefly reviewing the history and science of weather modification, this thesis bounds the aspects ... BWM, showing how they affect current weather modification policy in the military. Examples are shown ... military, and some military-unique needs for weather modification. After examining current ... should conduct a more in-depth review of weather modification to see if technological advances ...</td>
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Weather as a Force Multiplier: Owning the Weather in 2025
Authors: Tammy J. House; James B. Near Jr.; William B. Shields; Ronald J. Celentano; David M. Husband; AIR WAR COL MAXWELL AFB AL

This paper is to outline a strategy for the use of a future weather modification system to achieve military objectives rather than be reluctant to examine controversial issues such as weather modification, the tremendous military capabilities that could result from or coerce an adversary. Some of the potential capabilities a weather modification system could provide to a war fighting ... in five major areas are necessary for an integrated weather modification capability: (1) advanced nonlinear modeling, (2) transmission, (4) global sensor array, and (5) weather intervention techniques. Some intervention tools ...

Integrated Terminal Weather System (ITWS) 1994 Demonstration Phase OT&E Final Report
Authors: Thomas M. Weiss; Gloria Yastrov; Glenn Smythe; FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER ATLANTIC CITY NJ

... will produce a fully automated, integrated terminal weather information system to improve safety, efficiency, ... Aviation Administration (FAA) and National Weather Service (NWS) weather sensors as well as aircraft in 
 These products include current terminal area weather and near-term predictions of significant ... (a) were useful during operationally significant weather. (b) were displayed without the need for meteorological ... traffic planning/management during adverse weather; (2) Terminal airspace and runways were ... perceived controller workload during adverse weather conditions in the θ(θ+1=0.3)° ... ...

Weather Effects in Selected Air Warfare Simulations
Authors: John Burgeson; SCIENCE AND TECHNOLOGY CORP HAMPTON VA

... the results of a limited review of some of the literature on weather effects on electro-optical weapon systems, and how ... Extended Air Defense Simulation (EADSIM) ignores weather effects. When executed at high resolution, THUNDER simulates ... target acquisition, discrimination and kill. The only weather factors explicitly allowed are ceiling and visibility, ... of various portions of an attack mission affected by weather (e.g. Are probability models physics-based?). The realism of other ... user input, and the degree of THUNDER's sensitivity to weather input needs to be determined. Other conclusions and ...

Automated Surface Observing System, Site Technical Manual S100
Authors: NATIONAL WEATHER SERVICE SILVER SPRING MD

... Surface Observing System (ASOS) automatically collects weather data and provides accurate, 24-hour accumulated ... weather reports to local weather observers; weather forecasters, airport personnel, including pilots and air ... Federal Aviation Administration (FAA) and National Weather Service (NWS) personnel. ASOS functions include: measurement of weather elements, data processing and display, communication, and data ... data and formats, displays, archives, and reports the weather elements included in a surface ... flexibility of the ASOS, it can provide useful weather information in text, video, and audio ...

Weather Operations in the Transformation Era
Authors: John M. Lanico; AIR WAR COL MAXWELL AFB AL

... USAF, takes a compelling look at future weather operations. His hypothesis Is that a consolidated battlespace picture ... such example is our historical tendency to look at weather as a somewhat Isolated, tactical problem. Significant advances ... and advent of effects-based operations are propelling the USAF weather community away from traditional, single-Inf Stand-up ... WISR concept is based on substantially increasing the volume of weather data collected In-theater by using the same concept also advocates transmitting real-time weather information to the cockpit as a means to optimize the kill ...

The Next Generation Weather Radar (NEXRAD)/Air Route Surveillance Radar (ARSR)

Operational Comparison
Authors: Brian Dunbar; Jeff Mittelman; MITRE CORP BEDFORD MA

... (FAA), and Department of Defense are in the process of fielding the Next Generation Weather Radars (NEXRAD). These doppler weather radars, ... Radar (WSR)-88D, will be replacing the WSR-57 and WSR-74 weather radars in use today. The NEXRAD data will be used ... of the Air Route Surveillance Radar (ARSR) weather data currently being used by air traffic controllers. .... NEXRADs and ARSRs to detect and present significant weather in order to determine the operational impact of using NEXRAD data ... comparison study. NEXRAD, TDWR, ASR-9, WSR-88D, Radar. Weather, Surveillance, Reflectivity, Air Traffic control.

Analysis of Performance Characteristics of the MWR-05XP Mobile Weather Radar
Authors: Jeffrey B. Knorr; NAVAL POSTGRADUATE SCHOOL MONTEREY CA DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

... ProSensing, Inc., Amherst, MA to retrofit this radar with a weather processor. The intent is to provide a military capability to ... an analysis of numerous aspects of the radar's performance as a weather sensor. The ability of the MWR-05XP radar to detect rain ... to determine correlation and decorrelation times for weather signals with varying rms velocity spread. ... improvement introduction has been computed for a Rayleigh weather target with varying pulse-to-pulse correlation and curves ... scan strategy is discussed with emphasis on obtaining weather signal parameter estimates with small variance while ...

Adding Weather to Wargames
Authors: Sean G. O'Brien; Richard C. Shirley; ARMY RESEARCH LAB WHITE SANDS MISSILE RANGE NM COMPUTATIONAL AND INFORMATION SCIENCE DIRECTORATE

... decision aid, and the rules embodied in the Integrated Weather Effects Decision Aid (IWEDA) we developed techniques that allowed significant improvement in weather effects and impacts for wargames. TAWS was ... infrared sensors acquiring targets under those weather conditions. IWEDA rules were used in ... AWARS model. AWARS was modified to incorporate weather impacts upon sensor operation and platform ... a favorable comparison with table look-up methods. Weather effects upon combatant platform mobility were ... in both the presence and absence of adverse weather conditions were tested and are summarized.

CRITICAL FIRE WEATHER PATTERNS, THEIR FREQUENCY AND LEVELS OF FIRE DANGER

Authors: Melvin K. Hull; Clyde A. O'Dell; Mark J. Schroder: PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION BERKELEY CA

... both urban and rural areas. Identification of the weather types causing critical burning conditions in ... of much practical value. Knowing what the critical weather types are and where they influence burning ... know when they will occur and the type of weather and burning conditions that can be expected ... a step in that direction. Ten years of synoptic weather maps (1951-1960) were studied to determine ... showing mean values and variations of weather parameters and fire danger indexes, ... should be able to make a first approximation probability statement about the occurrence of a particular weather event ...

The Effects of Weather on Rapid Runway Repair, Volume 2

May 1983 317 pages

Authors: J. M. Whitehead; M. D. Hoffman; P. G. Potter; C. P. Neuswanger; M. M. Wilding: BDM CORP MCLEAN VA

... This report presents the results of a study to identify the effects of weather on Rapid Runway (RRR). There are two major components of the study. The first characterizes the effects of weather affect RRR, by area for Korea, Europe, and ... and humidity. The second component studies the effects of weather on the RRR process. The process is divided into activities, with associated efficiencies under various weather conditions. Values for efficiencies are developed from military and ... The report identifies potential solutions to some weather related problems, and makes recommendations for ...

Weather as the Decisive Factor of the Aleutian Campaign, June 1942- August 1943

1993 125 pages

Authors: Carol A. Wilder: ARMY COMMAND AND GENERAL STAFF COLL FORT LEAVENWORTH KS

... an examination of historical data to determine if weather was the decisive factor of the Aleutian Campaign. The campaign was ... made attempts at coordinated actions futile. The intense weather of the North Pacific severely complicated operations ... Harbor and the American response is examined. The role of the weather is also examined as the Americans attempt to bomb the ... of Kiska and Attu. Finally, the influence of weather on the amphibious landings and ensuing ground action ... the islands is reviewed. Though a dominant factor, weather was not the decisive factor at the tactical level of ...

Temporal Weather Impacts Upon Exterior Intrusion Detection Systems

Dec 1995 137 pages

Authors: Charles C. Ryerson; Lindamae Peck: COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER NH

... to intruders. This report is a technical analysis of causes of weather driven temporal changes in the environment that impact ... of reliability. This is accomplished by identifying temporal variations in weather that are sufficiently general to be identified as patterns, and ... respond to these patterns. The result is an understanding of how weather conditions influence the ability of types of IDSS ... intruder while successfully discriminating against weather created conditions within a detection zone ... seasonal. Within each temporal scale, weather processes common at that scale are explained. Topics ...

The Effects of Cold Weather on Tactical Operations

Jan 1, 1997 99 pages

Authors: Paul D. West; John V. Farr; Gregory S. Fortier; Kevin D. Lilly; Gerald D. Insall: MILITARY ACADEMY WEST POINT NY

The study of weather effects on tactical military operations has focused almost exclusively on human factor ... and less yet to integration of known weather effects into commonly used training and ... human factors studies, exploration into cold weather effects in a combat simulation, the need is highlighted for ... mobility model. From a mounted operations perspective, cold weather and snow can affect many factors ... and man/machine effects during cold weather. A studied directed at quantifying the effects of cold ... interest. Atmospheric conditions unique to cold weather also warrant attention. Detections and ...

Determining If "Space Weather" Conditions Should Be Considered in the Intelligence Preparation of the Battlefield Process

June 5, 1998 93 pages

Authors: Thomas B. Froonickx: ARMY COMMAND AND GENERAL STAFF COLL FORT LEAVENWORTH KS

... space environmental conditions, commonly referred to as space weather, should be considered in Army Intelligence Preparation of the Battlefield (IPB). Space weather refers to a variety of naturally occurring phenomena involving electromagnetic radiation, ... of Army systems that are adversely affected by space weather. These systems are used at all echelons by ... potential mission impacts and failures due to the effects of space weather. In determining the utility of space weather ... and system operators could use space weather information to mitigate the adverse effects. The study concludes ...

An Intelligent User Interface to Support Air Force Weather Product Generation and Automated Metrics

Mar 2000 214 pages

Authors: Darryl N. Leon: AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Air Force pilots require dependable weather reports so they may avoid ... flying conditions. In order to better gauge the accuracy of its weather products, Air Force ... requirement for an Air Force- wide automated weather metrics program. Under the guidelines for this program ... forecasts will automatically be compared to observed weather to determine their accuracy. Statistics will be collected in the hopes ... however, the system must also
have weather domain knowledge to understand when the input data ... observer during product generation, with the ultimate goal of producing more accurate weather products ...

**Weather Impact Decision Aids (WIDA)**

Authors: Melanie J. Gouveia; Richard B. Bensinger; Jeffrey S. Morrison; ANALYTIC SCIENCES CORP READING MA

Automated Mission Planning Software (WAMPS) will ... aids can benefit mission planning. The Target Acquisition Weather Software (TAWS) will be fielded to replace the aging DOS-based Electro-Optical ... (IRTSS) and Night Vision Goggles Operations Weather Software (NWS) programs. Together, these programs ... of time using precision guided munitions, automation and inclusion of weather effects is essential.

**Analysis of Performance Characteristics of the Naval Postgraduate School MWR-05XP**

Authors: Jeffrey B. Knorr; NAVAL POSTGRADUATE SCHOOL MONTEREY CA DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

... ProSensing Inc, Amherst, MA to retrofit this radar with a weather processor. The intent is to provide a military capability to ... an analysis of numerous aspects of the radar’s performance as a weather sensor. The ability of the MWR-05XP radar to detect rain ... to determine correlation and decorrelation times for weather signals with varying rms velocity spread. ... integration improvement has been computed for a Rayleigh weather target with varying pulse-to-pulse correlation and curves ... , scan strategy is discussed with emphasis on obtaining weather signal parameter estimates with small variance while ...

**Combining Spatial Statistical and Ensemble Information in Probabilistic Weather Forecasts**

Authors: Veronica J. Berrocal; Adrian E. Rafferty; Tilmann Gneiting; WASHINGTON UNIV SEATTLE DEPT OF STATISTICS

... that generates calibrated probabilistic forecast products for weather quantities at individual sites. This paper introduces the ... to generate calibrated probabilistic forecasts of whole weather fields simultaneously, rather than just weather. ... Spatial BMA method provides statistical ensembles of weather field forecasts that take the spatial structure of ... the Spatial BMA ensemble are obtained by dressing the weather field forecasts from the dynamical ensemble with simulated spatially ... the raw ensemble, both at individual sites, for weather field forecasts, and for forecasts of composite quantities ...

**The Effects of Weather on Rapid Runway Repair, Volume 1**

Authors: J. M. Whitehead, M. D. Hoffman; P. G. Potter; C. P. Neuswanger; M. M. Wilding; BDM CORP MCLEAN VA

... volumes. Volume I contains the technical analysis and weather effects on RRR process, while Appendix A, ... This report presents the results of a study to identify the effects of weather on Rapid Runway Repair(RRR). There are ... major components of the study. The first characterizes the aspects of weather that affect RRR, by area for Korea, Europe, and ... , and humidity. The second component studies the effects of weather on the RRR process. The process is divided into activities, with associated efficiencies under various weather conditions. Values for the efficiencies are developed from military and ...

**The Severe Weather Warning Process Using the WSR-88D at the Raleigh Weather Forecast Office**

Authors: Debra K. Houm; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

... and tornado forecasts. In recent years, the Doppler radar was developed in an attempt to increase severe weather warning timeliness and accuracy. This research is a preliminary analysis of the severe weather warning process using the WSR-88D at the Raleigh Weather Forecast Office (RDW WFO). A schematic representation of the warning process was developed based on ... warned counties are called leading to the verification of 38 percent of the warnings during the severe weather episode. Seventy percent of these severe weather reports are accurate if Storm Data is ...

**Free Cockpit Displays of Traffic and Weather Information Effects of Dimension and Data Base Integration**

Authors: Janelle V. O'Brien; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

... displays that effectively depict traffic and weather information as more and more responsibility ... integration through overlays of traffic and weather information within displays). It was hypothesized that the 2D ... would result in fewer traffic and weather conflicts then the 3D displays, replicating ... separated displays for trials in which both weather and traffic were critical for maneuver ... smaller percentage of conflicts with traffic and weather hazards. The results regarding database integration suggest that displays in which traffic and weather are overlaid result in fewer hazard conflicts ...

**Management Organization for Army Weather Programs and Support Functions**

Authors: Carl H. Chesley; Vincent P. Grock; SCIENCE AND TECHNOLOGY CORP HAMPTON VA

This report records the results of the investigators' review of weather support management within the U. S. Army, both recently ...’s request, describes a long-term absence of a positive weather culture that has engendered a failure to use weather ... some exciting progress, the overall configuration of Army weather support was peppered with a lack of direction, little soldier ... also documented observations of specific problems in Army weather support, and where reasonable, offered possible solutions ... recorded some of the problem commentaries of the Army weather community and their suggested solutions. ...
Limited Job Task Analysis (JTA) For Aviation Weather Products

Authors: William Banner, Thomas Carty, FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER ATLANTIC CITY NJ

To assist in the understanding of weather product use by Air Traffic Control Specialists (ATCS) and Automated Flight Service Station (AFSS) ... TMCs. The second stage of the JTA involved confirming the flowcharts and weather tables developed during the first stage. This was accomplished by comparing the flowcharts and weather tables to observed job tasks and weather information requirements of specialists and controllers at the FL. Worth AFSS and ... are discussed in detail along with issues relating to the user system interface of weather systems and recommendations for new aviation weather products.

Antarctic Operational Weather Forecasting

Authors: Sean R. Keaveney, MARYLAND UNIV COLLEGE PARK DEPT OF METEOROLOGY

... Guard. Flights to and around the continent require accurate operational weather forecasts to minimize the threat posed by Antarctica's harsh, highly variable weather. This paper reviews literature on significant Antarctic weather features, primarily katabatic winds and mesocyclones, around McMurdo Station, ... It then describes the analysis and forecasting tools, specifically, Automatic Weather Stations, space-based remote sensing, and numerical weather prediction, used by USAP forecasters to create their weather forecasts. Problems with these tools and required improvements, including the ...

The Impacts of Weather Forecasts on Military Operations: A System for Conducting Quantitative Near-Real Time Analyses

Authors: Mark Butler, NAVAL POSTGRADUATE SCHOOL MONTEREY CA

... collecting and analyzing in near-real time weather forecast and observational data to assess: ... major goal of the system is to quantify the impacts of weather forecasts on the planning execution and outcomes ... during mission planning in response to forecasted weather (e.g. changes in mission schedule targets weapons ... plans that occurred during missions in response to weather conditions actually encountered by air crews ... mission impacts (e.g. TAWS WOF accuracy weather impacts on weapon sensors); and (6) forecast ... and mission impacts with respect to specific weather factors (e.g. surface and aloft winds ... weather and evaluation (OT&E) Operational Test Generation (NEXRAD) Principal User Processor (PUP) operational test criteria (as outlined in AFFTC-TH-08-004) for five airfields: Keflavik, Iceland; Goose Bay, Canada; ... single location best suited, climatologically, to perform flight testing. Criteria tested and weather conditions evaluated include artificial and natural in-flight icing and rain, wet, slushy, ... Numerous tables and graphs are used to demonstrate the percent frequency differences of the adverse weather conditions between the five locations. ... Climatology, Adverse weather testing, Adverse weather site selection, ...

SYNOPTIC WEATHER TYPES ASSOCIATED WITH CRITICAL FIRE WEATHER

Authors: Mark J. Schroeder, Monte Glowinsky, Virgil F. Henricks; Frank C. Hood; Melvin K. Hull; PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION BERKELEY CA

Mass fires are likely to spread rapidly and burn intensely when strong winds are combined with low humidities and high temperatures, particularly after a rainy period. To identify synoptic weather types that create such periods of critical fire weather, the 48 contiguous states were divided into 14 regions and fire danger indexes were computed from weather data at 89 stations for the years 1951-60. Surface weather types and upper-air patterns associated with high fire danger are described for each region.

Adverse Weather Test Site Selection Study

Authors: Steven R. Christy, Ronald L. Comoglio; Robert G. Hauser; Randy J. Lefevere; AERONAUTICAL SYSTEMS CENTER WRIGHT-PATTERSON AFB OH

This report details the percent frequency of occurrence of the adverse weather testing criteria (as outlined in AFPTC-TH-08-004) for five airfields: Keflavik, Iceland; Goose Bay, Canada; ... single location best suited, climatologically, to perform flight testing. Criteria tested and weather conditions evaluated include artificial and natural in-flight icing and rain, wet, slushy, ... Numerous tables and graphs are used to demonstrate the percent frequency differences of the adverse weather conditions between the five locations. ... Climatology, Adverse weather testing, Adverse weather site selection, ...

Next Generation Weather Radar (NEXRAD) Principal User Processor (PUP) operational Test and Evaluation (OT&E) Operational Test Plan

Authors: Baxter R. Stretcher, FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER ATLANTIC CITY NJ

... procedural approach, method, and responsibilities to be employed in conducting the Operational Test and Evaluation (OT&E) on the Next Generation Weather Radar (NEXRAD) Principal User Processor (PUP) system. The testing of the NEXRAD PUP will determine the operational suitability and effectiveness of the NEXRAD PUP aviation weather products used by the Center Weather Service Unit (CWSU) meteorologists for air traffic control (ATC), ... Principal User Processor (PUP), Next Generation Weather Radar (NEXRAD), Center Weather Service Unit (CWSU), Meteorologists.

Weather Modification: The Ultimate Weapon?

Authors: Angus Watt, AIR WAR COLL MAXWELL AFB AL

Within the topic of true weather modification, there is a considerable diversity of issues, not the least of which is the ... agriculturally-oriented, while the military tends to be more interested in using weather for hostile purposes.
While each group may use similar ... With the foregoing in mind, the focus of this paper will be on the deliberate use of weather modification techniques by the military. The discussion will concentrate on the practicality ... morality of weather warfare, with the aim of demonstrating that military weather modification may be technically feasible, but some of its forms ...

**The ATC Operational Evaluation of the Prototype Integrated Terminal Weather System (ITWS) at Dallas/Fort Worth and Orlando Airports (May-September 1993)**

Authors: Thomas M. Weiss

The Integrated Terminal Weather System (ITWS) was developed by Massachusetts Institute of Technology/Lincoln Laboratory (MITLL). The ITWS processor acquires data from Federal Aviation Administration (FAA) and National Weather Service (NWS) weather sensors in the terminal area and provides an integrated set of safety and planning weather products to air traffic personnel. An operational evaluation of the ITWS functional prototype was ... at these sites was to evaluate various technical and operational issues of ITWS weather products and their display and usability on the GSD. (AN) ...

**Forecaster Guide to Tropical Meteorology, Updated**

Authors: Colin S. Ramage

... by Maj Gary D. Atkinson, has served as the reference manual for USAF weather forecasting in the tropics since it was first published in 1971. Although it has endured for the past 20 years. HQ Air Weather Service recognized the need for an update and contracted with tropical forecasting authority Dr ... suitable for forecasters. Analysis and forecasting of disturbances, cyclones, severe weather, terminal weather, etc., are at treated length. The uses of climatology and the interpretation and use of weather satellite imagery are emphasized. Numerous figures adapted from the literature or ...

**Forecaster Guide to Tropical Meteorology, AWS TR 240 Updated**

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**Intercomparison of Icing Aviation Impact Variable Forecasts Produced During Real-Time Mesoscale Numerical Weather Prediction**

Authors: Christopher M. Stock

... initiated between the University of Oklahoma (OU), the Air Force Weather Agency (AFWA), and the Cooperative Program for Operational ... (COMET) to evaluate the use of real-time mesoscale numerical weather prediction (NWP) by USAF forecasting personnel. Its goal ... aviation impact variables (AIVs) which could be incorporated directly into the weather services provided by the base weather station (BWS) at Tinker Air Force Base (AFB). During a Winter Operational Period (WOP), ... Icing forecast products derived from algorithms developed by various weather agencies world-wide were generated using the model ...

**Operational Test and Evaluation (OT&E) Test Plan for the Federal Aviation Administration (FAA) Bulk Weather Telecommunications Gateway (FBWTG)**

Authors: Bart Khatiwala

The Federal Aviation Administration (FAA) Bulk Weather Telecommunications Gateway (FBWTG) is a communications gateway to the FAA for high-resolution gridded weather forecast data (e.g., Eta Forecast Model, Aviation (AVN) and Rapid ... Data Collection and Reporting System (MDCRS)) from the National Weather Service Telecommunications Gateway (NWSTG). The FBWTG will provide ... to simultaneously and continuously receive high-resolution gridded weather forecast data and MDCRS data from the ... System Command Center (ATCSCC), and FBWTG to National Weather Service (NWS) Filter Unit (NFU)-Test device ...

**U.S. Navy Heavy Weather Mooring Criteria**

Authors: William N. Seelig

... Navy ships to go to sea prior to forecasted heavy weather, such as an approaching hurricane or major storm. However, some ... These ships must be securely moored during heavy weather to piers, wharves or Fleet Moorings to ensure safety of the ... of life. Therefore, this report: (1) Proposes U.S. Navy heavy weather (Mooring Service Type 3) requirements by region. (Inactive, ... in this report). (2) Recommends Navy wide heavy weather environmental design criteria applied to key Navy regions. (3) Provides technical guidance for the analysis, design, construction, and use of heavy weather mooring facilities.

**At Atmospheric Sounding Program: An Analysis and Forecasting Tool for Weather Hazards on the Battlefield**

Authors: Jeffrey E. Passner

To assist the staff weather officer and enhance weather predictions in the battlefield, the Atmospheric Sounding Program (ASP) has been designed to furnish a series of weather outputs with an emphasis on weather hazards such as turbulence, icing, clouds, thunderstorms, and surface visibility. The ASP is initialized by either upper air observations or output from the Battlescale Forecast Model (BFM). The BFM produces a 24 hour forecast; thus, the weather hazard is placed into the database and can be displayed for the 24 hour forecast period.
National Oceanic and Atmospheric Administration: National Weather Service

Mar 29, 2000 13 pages

Authors: Joel C. Willemsen; GENERAL ACCOUNTING OFFICE WASHINGTON DC ACCOUNTING AND INFORMATION MANAGEMENT DIV

Modernization and Weather Satellite Program

... (NOAA). At your request, we will discuss the status of the National Weather Service (NWS) systems modernization and the National Environmental Satellite... the coming year, NWS plans to finish commissioning' the Advanced Weather Interactive Processing System (AWIPS), the final system of the modernization... to improve radar and satellite data processing and to provide weather forecasters with a full range of interactive forecasting techniques. The agency... acquisitions. Regarding the GOES program, NOAA continues to deploy weather satellites to ensure adequate satellite coverage. However, because...

Data Warehouse Techniques to Support Global On-Demand Weather Forecast Metrics

Mar 2000 94 pages

Authors: Meriellen C. Joga; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

Air Force pilots and other operators make crucial mission planning decisions based on weather forecasts; therefore, the ability to forecast the weather accurately is a critical issue to Air Force Weather (AFW) and its customers. The goal of this research is to provide Air Force Weather with a methodology to automate statistical data analysis for the purpose of providing on-demand metrics. A data warehousing methodology is developed and applied to the weather metrics problem in order to present an option that will facilitate on-demand metrics. On-line...

Meteorological Techniques

Jul 15, 1998 241 pages

Authors: Maria Reymann; Joe Piasek; Fizal Hosein; Salinda Larabee; Greg Williams; AIR WEATHER SERVICE SCOTT AFB

Full Text

Contains weather forecasting techniques of interest to military meteorologists, in three sections: surface weather elements, flight weather elements, and severe weather. Includes both general and geographically specific rules of thumb, results of research, lessons learned from experience, etc., gathered from military and other sources. Update to earlier Air Weather Service Manual 105-56 "Forecasting Techniques."

A Case Study of the Persistence of Weather Forecast Model Errors

Jan 2005 48 pages

Authors: Barbara Sauter; ARMY RESEARCH LAB WHITE SANDS MISSILE RANGE NM

Full Text

Decision makers could frequently benefit from information about the amount of uncertainty associated with a specific weather forecast. Automated numerical weather prediction models provide deterministic weather forecast values with no estimate of the likely error. This case study examines the day-to-day persistence of forecast errors of basic surface weather parameters for four sites in northern Utah. Although exceptionally low...

Biomechanical Analyses of Body Movement and Locomotion as Affected by Clothing and Footwear for Cold Weather Climate

Apr 2005 110 pages

Authors: Brian E. O'Hearn; Carolyn K. Bensei; Amy F. Polony; GEO-CENTERS INC NEWTON CENTRE MA

Full Text

A study of Army cold weather clothing was conducted to determine effects on soldiers' movements and walking gait... temperate duty uniform was also compared with performance in cold weather clothing, and differences in walking gait associated with regular combat boots and with cold weather foot gear were investigated. Study participants, 13...the shoulder. Compared with the temperate duty uniform, cold weather clothing changed walking patterns; participants leaned further... the arms less at the shoulders with the multilayered clothing. The cold weather boots also interfered with leg swing, compared...

Development of a Weather Radar Signal Simulator to Examine Sampling Rates and Scanning Schemes

Sep 2005 175 pages

Authors: Ulf P. Schroder; NAVAL POSTGRADUATE SCHOOL MONTEREY CA DEPT OF INFORMATIONAL SCIENCES

Full Text

... representing the radar return permits investigation of the performance of different estimators for the weather signal parameters and their sensitivity when varying radar parameters... realism to study the effects on the radar return for different phenomena. A Weather Radar Signal Simulator has been developed in MATLAB... PRI, pulse compression using a chirp, and variation of both weather and radar input parameters. Post processing capabilities include autocorrelation and FFT (for single PRF only); estimation of weather parameters such as reflectivity factor, Z; average doppler, radial velocity, ...

Time Series Analyses of Integrated Terminal Weather System Effects on System Airport Efficiency Ratings

Oct 2007 32 pages

Authors: Elaine M. Pfleiderer; Scott M. Goldman; Thomas Chidester; FEDERAL AVIATION ADMINISTRATION OKLAHOMA CITY OK CIVIL AEROSPACE MEDICAL INST

Full Text

The FAA has initiated efforts to improve weather information, forecasting, and dissemination to enhance both safety... as a metric of facility operating efficiency that accounts for weather by using either actual demand or the facility-set arrival rate... ability to handle departures or arrivals due to prevailing weather conditions. Interventions aimed at improving performance should be... of interventions aimed at improving performance during inclement weather. One such intervention is the Integrated Terminal Weather System (ITWS). In the present study, we applied time series analysis to average daily...

WAVE SPECTRA ESTIMATED FROM WAVE RECORDS OBTAINED BY THE OWS
WEATHER EXPLORER AND THE OWS WEATHER REPORTER (III)

Authors: L. Moskowitz; W. J. Pierson; E. Mehr; NEW YORK UNIV BRONX SCHOOL OF ENGINEERING AND SCIENCE

As a part of the problem of developing numerical wave forecasting procedures for the North Atlantic Ocean, selected sequences of the weather maps for the North Atlantic for which wave data were known to be available were studied in detail for the five year ... for study. For these dates and times, the National Institute of Oceanography provided copies of the wave records that were obtained by the OWS Weather Explorer and by the OWS Weather Reporter. In total, about 800 wave records were provided, and a complete spectral analysis is planned for about 400 of these records. Data are presented in ...

SONIC BOOM

Authors: WEATHER WING (6TH) WASHINGTON DC

Full Text

Because there are important meteorological effects on shock wave propagation, weather officers should become acquainted with some of the terminology and the physical principles of weather effects on sonic boom propagation. Calculation of shock wave patterns covering many square ... an exceedingly complex operation which involves several parameters other than weather data. Sonic booms caused by either aircraft or missiles are ... booms with the aid of electronic computers. Current knowledge of the effect of weather parameters on sonic boom has been gained primarily from limited ...

Cold Weather Field Study of Marine Corps Emergency Medical Treatment

Authors: Kevin Laxar; William Rogers; George Moeller; NAVAL SUBMARINE MEDICAL RESEARCH LAB GROTON CT

Full Text

To assess the extent and sources of impairment due to cold weather field conditions, times to complete an emergency medical treatment scenario (EMTS) ... from a snowstorm with temperatures near 22 F (-5.6 C) to clear weather around 47 F (8.3 C). Results showed that performance under the milder conditions ... practice is beneficial. Better performance was found to be related to previous cold weather medical training and experience. These findings, and the comments ... of a decrement in medical treatment performance under cold weather field conditions. Recommendations were made for improved adhesive tape, ...

Weather and Overlord: Contemporary Lessons

Authors: G. J. Pfeffer; AIR WAR COLL MAXWELL AFB AL

Full Text

The purpose of this Cold weather Handbook is to provide a consolidated training publication in support of the United States Navy's Surface Ship Fleet Arctic/Cold Weather Operations. The uniqueness of this Handbook is its explicit, single-source approach in addressing current problems facing the fleet in cold weather. It draws heavily upon lessons learned in recent operations and exercises and uses that collective experience to provide solutions to some critical cold weather operations problems.

U. S. Navy Cold Weather Handbook for Surface Ships

Authors: OFFICE OF THE CHIEF OF NAVAL OPERATIONS WASHINGTON DC

Full Text

A daily history of weather that affected United States military operations from 8 August 1990 through 31 March 1991 in the conduct of the Persian Gulf War. Illustrations include weather satellite imagery of the study area, which comprised Saudi Arabia, Kuwait, Iraq, and areas immediately adjoining. Separate chapters describe the weather during Operations DESERT SHIELD, DESERT STORM, and PROVIDE COMFORT. ... wind chills) for selected stations in the study area. CLIMATOLOGY, METEOROLOGY, WEATHER, SATELLITE PHOTOGRAPHY, METEOROLOGICAL SATELLITES, MILITARY OPERATIONS, WARFARE, GULF WAR ...

Predictors of Cold Weather Health Behaviors: A Replication and Extension

Authors: Ross R. Vickers Jr.; Linda K. Hervig; NAVAL HEALTH RESEARCH CENTER SAN DIEGO CA

Full Text

... prior findings that the Health Brief Model (HBM) can predict cold weather health behaviors (CWHB). Major findings in a study of marines in cold weather training were: (a) Perceived efficacy, one component of the HBM, was a weak, but reliable ... foot care. Modification of health behaviors is unnecessary under the relatively mild weather conditions studied because the minor behavioral deficiencies that occur do not ... More extreme conditions might make behavior modification desirable in other cold weather settings. If so, modifying rations and supplying foot powder appear ...

Physiological Acceptance Criteria for Cold Weather Clothing

Authors: Nancy A. Pinental; NAVY CLOTHING AND TEXTILE RESEARCH FACILITY NATICK MA

Full Text

... the present investigation was to develop physiological limit criteria for cold weather clothing items which meet the limits for protection against development of ... and temperature sensation were examined. Under many conditions that Navy cold weather clothing items are worn, it is not practical to expect that the optimal ... and thermal discomfort, the following physiological criteria for acceptance of cold weather clothing items were developed: (1) a mean weighted skin temperature > or ... be met. Application of these criteria will enable us to better evaluate and compare cold weather clothing items.

Gulf War Weather

Authors: Kenneth R. Walters Sr.; Kathleen M. Traxler; Michael T. Gilford; Richard D. Arnold; Richard C. Bonam; AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER SCOTT AFB IL

Full Text

Environmental Assessment of the Relocation of a Weather Training Division to Keesler

Authors: DEPARTMENT OF THE AIR FORCE WASHINGTON DC

The action detailed in this assessment is the relocation of the Weather Training Division and the reallocation of personnel authorizations from Chanute AFB (Rantoul, Illinois) to Keesler AFB (Biloxi, Mississippi) as ... located at Chanute AFB are also being addressed in separate EAs. The action at Keesler AFB includes the construction of a Weather Training Facility, demolition of two existing buildings at the Weather Training Facility site, installation of the Next Generation Weather Radar (NEXRAD) system, and renovations to a dormitory, a dining hall, and a technical training building. ...

New Techniques for Contrail Forecasting

Authors: Jeffrey L. Peters; AIR WEATHER SERVICE SCOTT AFB IL

... DO to update previous contrail forecasting research done by Herbert Appleman for HQ Air Weather Service in 1953. Advancements in aircraft power plants, especially the development of bypass turbofan ... attempt to update and improve current contrail forecasting methods was performed by the SAC Directorate of Weather (SAC/DOW). It describes the development of new contrail forecast algorithms for several types of ... accuracy over the Appleman technique now in use at the Air Force Global Weather Central. Weather, Climatology, Clouds, Cirrus, Clouds, Forecasting, Algorithms, Condensations trails, Contrails ...

Next Generation Weather Radar (NEXRAD) Principal User Processor (PUP) operational Test and Evaluation (OT&E) Operational Report

Authors: Baxter Stretcher; FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER ATLANTIC CITY NJ

... report details the results of the Operational Test and Evaluation (OT&E) Operational Test of the Next Generation Weather Radar (NEXRAD) , Principle User Processor (PUP). The PUP was evaluated at the Leesburg, ... 22 through April 1, 1993. The objective of the OT&E Operational Test was to obtain the Central Weather Service Unit (CWSU) meteorologists' evaluation of the NEXRAD PUP. A questionnaire was used to ... by the PUP, the workload, operational procedures, radar connections, and training. Next Generation Weather Radar (NEXRAD), Principle User Processor (PUP), Central Weather Service Unit (CWSU).

Weather, European Theater Weather Orientation (ETWO)

Authors: Janie W. Santos; UNITED STATES AIR FORCES IN EUROPE APO NEW YORK 09012

This publication provides a general introduction to the geography, climatology and weather of the European theater. Conscientious study of this pamphlet will ensure newly assigned forecasters assume their duties more rapidly. We have provided review questions at the end ... HQ USAFE/DOW. We would be pleased to hear any suggestions for improvement. Winds, Turbulence, Tornadoes, Analysis, USAFE Europe, Mediterranean Sea, Weather, Orientation, Climatic controls, Climatology, General Circulation, European flying weather, Pressure systems, Storm tracks, Upper air winds, Jet stream, Fog, Thunderstorms.

Lightweight Extreme Weather Shelter Market Investigation

Authors: Laura A. Ryan; ARMY NATICK RESEARCH DEVELOPMENT AND ENGINEERING CENTER MA

... U.S. Army Special Operations Forces (SOF) has the need for a backpackable extreme weather shelter. The shelter is to provide protection for three soldiers in the case of extreme weather conditions, such as sand storms, heavy winds, blowing rain and snow. The ... statement of Need Clothing and Individual Equipment for a three man extreme weather shelter. The findings of this investigation indicate that there are several commercially available, state-of-the-art tents capable of meeting all of the performance characteristics for a lightweight extreme weather shelter.

A Mathematical Analysis of the Janus Combat Simulation Weather Effects Models and Sensitivity Analysis of Sky-to-Ground Brightness Ratio on Target Detection

Authors: Vincent F. Shorts; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

The Janus combat simulation offers the user a wide variety of weather effects options to employ during the execution of any simulation run, which can directly influence detection of opposing forces. Realistic weather effects are required if the simulation is to accurately reproduce ‘real world’ results. This thesis examines the mathematics of the Janus Weather Effects Models. A weather effect option in Janus is the Sky-to-Ground Brightness Ratio (SGR). SGR affects an optical sensors ability to detect targets. It is ...

3-D Weather Displays for Aircraft Cockpits

Authors: Bradley S. Boyer; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

... to examine the effects of dimensionality and rotating frame of reference in a weather avoidance task. Forty student pilots, performed a 3-D route planning task to navigate around weather formations and arrive at a target within an airspace. The subjects, 1700, radial distance, and the 2-D displays also resulted in faster weather planning times. This additional distance and time is attributed to the ... found between the displays in terms of vertical distance traveled, penetrations of the weather formations, number of vectors created, or the evaluation of situational awareness.

On the Large Scale Circulation of the East Asia Mei-Yu Fronts and Secondary Weather Dimension Disturbances

Authors: Gongwang Si; NATIONAL AIR INTELLIGENCE CENTER WRIGHT-PATTERSON AFB OH

... the large scale circulation of the East Asian Mei-Yu fronts as well as their secondary weather dimension or subsynoptic disturbances. It brings out the following points. The East Asian Mei-Yu ... Hadley (or tradewind)
Proceedings of the International Conference on Cold Weather Military Operations Held In Burlington, Vermont on 28 February-2 March 1995

Authors: Nicholas H. Collins; COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER NH

The 1995 International Conference on Cold Weather Military Operations brought together more than 150 scientists, engineers and soldiers from ten ... and the civilians who support the soldier who must be prepared to operate in cold weather must be proactive in identifying issues and creating a greater awareness of the impact of cold weather on military operations. Without a realistic perspective of the impact of cold, equipment, ... be lacking and our readiness to operate effectively in winter and cold weather will be compromised. Without awareness the proponency and resources to address even the most ...

Weather Forecasting, Radar Availability Requirement Not Being Met

May 31, 1995 49 pages

Authors: GENERAL ACCOUNTING OFFICE WASHINGTON DC ACCOUNTING AND FINANCIAL MANAGEMENT DIV IV

NEXRAD is a Doppler radar system that measures wind velocity in severe weather, tracks storm movement and intensity, and generates data and imagery ... users, such as air traffic controllers. NEXRAD is expected to provide improved weather radar information, thus increasing the accuracy, timeliness, and credibility for ... flash floods, turbulence, wind shear, and other types of hazardous weather and related events. The radars are also expected to be extremely useful in analyzing a variety of other weather events, including estimated accumulated rainfall and analyzing large-scale precipitation systems ...

A Tactical Present Weather Sensor for Air Force Applications

Oct 25, 1994 47 pages

Authors: D. F. Hansen; W. K. Shubert; HSS INC BEDFORD MA

A Present Weather Sensor has been developed for Air Force tactical applications under a Phillips Laboratory Broad Agency Announcement to meet the more general requirement for "Automated Fixed/Bare Based Weather Sensors". The Present Weather Sensor design is based on techniques evolved over a period of time by HSS Inc for the automated ... and rate of fall). Preliminary tests demonstrate that the performance of the tactical sensor is comparable to that of the performance of the highly regarded larger HSS Inc Present Weather Sensors. (MM)

Research in Automating Weather Templating Procedures for Aerial Intelligence

Preparation of the Battlefield (AIPB)

Aug 1995 42 pages

Authors: Heather D. Pfeiffer; NEW MEXICO STATE UNIV LAS CRUCES

This document describes a prototype software system that automates the generation of weather related templates used in the Aerial Intelligence Preparation of the Battlefield ... (AIPB) process. The software system is called the Terrain and Weather PB Software Toolkit (TWIST). The primary purpose of the prototype ... using artificial intelligence technology can be developed to effectively integrate weather, terrain, and doctrinal information and to accurately generate AIPB ... modules. One module serves as the user interface and performs weather and terrain analyses that generate gridded data bases covering ...

AWS Technical Library Accessions Bulletin 95-1

Oct 1995 14 pages

Authors: AIR WEATHER SERVICE SCOTT AFB IL

... AWS Technical Library Accessions Bulletin has resumed. For people new to Air Force Weather, the AWSTL Accessions Bulletin brings you the latest updates on the status ... the status tips for establishing automatic distribution for certain hard-to-get documents. Cataloging AF Weather Publications. As mentioned in our last bulletin (and in the last AWS technical catalog), we chose to close out the Catalog of Air Weather Service Technical Documents as of the end of 1991, the year in which the Air Weather Service was shown of its wings and squadrons. That catalog includes all numbered technical documents published ...

Use of the NSWCDD Weather Databases for Prediction of Atmospheric Transmission in Common Thermal Imaging Sensor Bands

Oct 1995 34 pages

Authors: Daniel E. Austin; Kenneth C. Hepler; Marilyn R. Rudzinski; NAVAL SURFACE WARFARE CENTER DAHLGREN DIV VA

At the time of this writing, the signal. The amount of attenuation depends on the sensor band and weather conditions, and may have a considerable affect on the strength of ... used to calculate the atmospheric transmission for a given range and set of weather conditions, but this can be time consuming and involves the specification of many variables. In an attempt to simplify this process, weather information previously combined into databases was processed into a form ... 10,000 (R10K), represent a worldwide sample of a larger collection of weather data, known as the Naval Surface Warfare Center, Dahlgren Division Environmental ...

Communist China's Research on Long-Range Weather Forecasting During the Past Decade

May 2, 1960 17 pages

Authors: Yang Chien-Chu; JOINT PUBLICATIONS RESEARCH SERVICE ARLINGTON VA

... production under the correct leadership of the Chinese Communist Party. The demand for weather forecasting by the various productive agencies has become increasingly more urgent and ... or in research. At the same time, China's research on long-range weather forecasting for the past decade is no exception to this rule. In 1958 medium and long-range weather forecasting was declared by the Central Meteorological Bureau to be one of the three cardinal ... the meteorological stations of China. ANNOTATION: Communist China's Research on Long-Range Weather Forecasting During the Past Decade. --Translation.
Weather Constrained Throughput: Substituting Spangdahlem and Ramstein for Rhein

Authors: Richard P. MaKeeve, AIR UNIV MAXWELL AFB AL

... operations out of Rhein Main AB are absorbed by Ramstein AB and Spangdahlem AB. Air Force leadership needs to be aware of the impact of the weather differences have on operations. This paper looks at the operational differences between these bases from a standpoint of weather constrained throughput. To get to the final weather constraining factors, a ten-year history of weather conditions at the bases in question were analyzed. The analysis was based off of the percent of each month that operations were...

Identification of Weather Deck Runoff Discharge Constituents Onboard a U.S. Navy Mine Countermeasure (MCM-1) Class Ship

Authors: Mary L. Wenzel, NAVAL SURFACE WARFARE CENTER CARDEROCK DIV BETHESDA MD SURVIVABILITY STRUCTURES AND MATERIALS DIRECTORATE

... Navy MCM-1 class ship to identify constituents that have the potential to contribute to weather deck runoff. The data obtained during the assessment will be used to develop the MPCF for weather deck runoff. The shipboard assessment team conducted a one day at-sea and... assessment, the following constituents were identified as having the potential to contribute to weather deck runoff (in order of predominance): MIL-G-24139, approximately three pounds... the RHIBs onboard ship; and Simple Green detergent used to clean the weather decks and topside equipment.

Extensible Markup Language as a Weather Tool

Authors: Michael J. Calidonna, AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING

... will extend the Core Mapping Application Program Interface (CMAPI) components to include weather data. The CMAPI project is headed by Air Force Research Lab (AFRL)/Information... areas. The first goal is to figure out how to overlay and display weather data on a dynamically linked Internet platform. This was accomplished by incorporating existing data from the Air Force Weather Agency (AFWA) into the CMAPI program in a static environment. The... (XML) and how it can contribute to characterizing structured data (i.e., weather data output from AFWA). Once this tool can be exploited, a dynamic...

Fighting the Cold: The Need for Standing Cold Weather Combat Capabilities

Authors: John G. Bechtol, NAVAL WAR COLL NEWPORT RI JOINT MILITARY OPERATIONS DEPT

... nation's wars. History has shown that unprepared military forces deployed to cold weather combat may suffer severe losses from the climate. An example of poorly prepared forces suffering unnecessary casualties due to the weather is the Aleutian Campaign of World War II. The preponderance of current cold weather training conducted among the services is focused on survival, and not on operations. Therefore, a Joint... functions. The confidence that he can introduce acclimatized forces into a cold weather theater with no further training gives the operational commander more options, and...

Suitability of Unidata MetApps for Incorporation in Platform-Independent User- Customized Aviation Weather Products Generation Software

Authors: Harrem P. Visser, AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

... resolution of meteorological models, demand for access to customized aviation weather products has increased exponentially. This has given rise to a need for a multi-purpose interactive aviation weather product generation software solution. This software solution must be... over current visualization applications used in the operational military aviation weather community. This thesis determines whether Unidata MetApps meets... to determine their suitability for incorporation in platform-independent user-customized aviation weather products generation software. The results prove that a...

Utility of Tactical Environmental Processor (TEP) as a Doppler At-Sea Weather Radar

Authors: Sean D. Robinson, NAVAL POSTGRADUATE SCHOOL MONTEREY CA

... Task Force Exercise (JTFEX) 00-2. On 15 May, TEP observed severe weather associated with a line of passing thunderstorms. These weather events proved serious enough to suspend mid-cycle flight operations for the USS George Washington (CVN 73) during its simulated wartime scenario. TEP is a significant benefit to nowcast weather forecasting and supports at-sea METOC and warfighters in two primary areas: improved... and tactics. Results from this case study demonstrate the importance of TEP as a Doppler at-sea weather radar in support of naval operations.

Report on Current Convective Weather Processes and Product Requirements at the Air Traffic Control System Command Center (ATCSCC) and Kansas City Air Route Traffic Control Center (ARTCC)

Authors: Danny Sims; Cynthia Fidalgo; Jeff Weinrich; WILLIAM J HUGHES TECHNICAL CENTER ATLANTIC CITY NJ

... report summarizes current processes and information sources used when convective weather impacts Air Traffic Control (ATC) operations at the... Traffic Control Center (ARTCC). In addition, user needs for convective weather forecast products are presented. ACT-32O collected information from both facilities... 2000. Based upon collected information, it is recommended that the integration of a convective weather forecast capability, for example, the National Convective Weather Forecast (NCWF), into the Traffic Situation Display (TSD) be investigated. In addition, further research should be conducted...

Using MHD Simulation for Space Weather Forecasting and Nowcasting

Authors: Jack H. Hughes Technical Center Atlantic City NJ

... the need for such a capability becomes even more critical. This paper describes the design and implementation of an MHD simulation model to forecast and nowcast space weather...

Weather Processes and Product Requirements at the Air Traffic Control System Command Center (ATCSCC) and Kansas City Air Route Traffic Control Center (ARTCC)

Authors: Sean D. Robinson, NAVAL POSTGRADUATE SCHOOL MONTEREY CA

... Task Force Exercise (JTFEX) 00-2. On 15 May, TEP observed severe weather associated with a line of passing thunderstorms. These weather events proved serious enough to suspend mid-cycle flight operations for the USS George Washington (CVN 73) during its simulated wartime scenario. TEP is a significant benefit to nowcast weather forecasting and supports at-sea METOC and warfighters in two primary areas: improved... and tactics. Results from this case study demonstrate the importance of TEP as a Doppler at-sea weather radar in support of naval operations.
Terminal Convective Weather Forecast (TCWF) 2000 Demonstration Report

Jun 2003  104 pages

Authors: Danny Sims; Starr McGettigan; Cynthia Fidalgo; WILLIAM J HUGHES TECHNICAL CENTER ATLANTIC CITY NJ

The Terminal Convective Weather Forecast (TCWF) 2000 Demonstration was conducted during the convective season at Air Traffic Control (ATC) ... at the Massachusetts Institute of Technology Lincoln Laboratory (MIT/LL) under FAA Aviation Weather Research Program funding. The product provides a graphical 0 to 60-minute forecast of convective weather for an airport terminal area. Results indicated overall positive improvements. Users reported the TCWF provided benefit in performing ATC tasks; was a beneficial supplement to the Integrated Terminal Weather System (ITWS); and enhanced situational awareness.

Meteorological Techniques

Jun 13, 2003  233 pages

Authors: Mark R. Mireles; Kirth L. Pederson; Charles H. Elfford; AIR FORCE WEATHER AGENCY OFFUTT AFB NE

Contains weather forecasting techniques of interest to military meteorologists. In three chapters: surface weather elements, flight weather elements, and convective weather. Includes both general specific rules of thumb, results of research, lessons learned from experience, etc. gathered from military and other sources. Updates and supersedes earlier AFWATN-98/002, Meteorological Techniques.

U.S. Army Tactical Weather Support Requirements for Weather and Environmental Data Elements and Meteorological Forecasts

Feb 2006  20 pages

Authors: Richard J. Szymber, ARMY RESEARCH LAB WHITE SANDS MISSLE RANGE NM

The U.S. Army has stated and validated their tactical weather support and data element requirements over the past 30 years. Over 80 weather and environmental data elements, along with their required accuracies, are required for Army tactical weather support. This report establishes the spatial (horizontal and vertical) and temporal resolutions for meteorological forecasts necessary to satisfy the validated accuracy requirements, based on Army echelons (levels of command). Similar information on resolutions in also provided for the new Army modular forces echelons and unit designations.

Analysis of Weather Forecast Impacts on United States Air Force Combat Operations

Mar 2006  120 pages

Authors: Karen M. Darnell; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Air combat operations. Quantitative assessments of forecasts and their operational impacts are essential to improving weather support for war fighters. We adapted an existing U.S. Navy, web-based, near real ... forecasts. We used the adapted system to collect and analyze data on Air Force Weather (AFW) forecasts, and the planning and execution of flying operations, at six Air Combat ... develop quantitative metrics of forecast performance and operational impacts. Our results indicate that planning weather forecasts (PWFs) have a higher potential for making positive contributions to air operations than ...
There is a long history of weather impacting military operations. Today’s U.S. Joint Forces must incorporate a thorough understanding of the role of weather in military operations. For largely cultural reasons, the Navy continues to view weather more as a potential hazard, or limit to operations rather than as actionable force-multiplying elements working with limited resources against an enemy seeking to exploit asymmetric advantages (e.g., terrain). A strategy for better incorporating weather into Maritime Operations and Plans through both organizational changes within the JFMCC and adopting a...

**Employing Net Centric Technology for a Mobile Weather Intelligence Capability**  
Jun 2004  
22 pages

Authors: David Sauter; Mario Torres; ARMY RESEARCH LAB WHITE SANDS MISSILE RANGE NM

Weather affects personnel, military operations and weapon systems at all echelons, down to the individual soldier level. Networking, communications, and computers (both hardware and software), these weather intelligence products (decision aids, alerts, map overlays, etc.) can... of the pervasive net centric technologies that will be utilized in the development and demonstration of the mobile weather intelligence capability. This capability will contribute to weather related information sharing and enhanced situational awareness at the lower echelons. A mobile computing device (Toshiba e800 personal...

**The Mesoscale Forecasting Process: Applying the Next Generation Mesoscale Forecast**  
Oct 5, 2006  
39 pages

Authors: Calvin C. Naegelin; Paul J. McCrone; AIR FORCE WEATHER AGENCY OFFUTT AFB NE

The weather forecast effort has progressed a long way past its embryonic stage of the barotropic forecast. Both computer power and our knowledge of atmospheric processes have increased substantially over the years, allowing for the classification of many weather phenomena into scales, including the global/hemispheric scale, the synoptic scale, the mesoscale, and the microscale. These... When performing a mesoscale forecast, however, it is prudent to use a mesoscale model, such as the Air Force Weather Agency's (AFWA) Weather Research and Forecasting (WRF) model.

**Meteorological Techniques**  
Jun 13, 2003  
237 pages

Authors: Mark R. Mireles; Kirth L. Pederson; Charles H. Ellford; AIR FORCE WEATHER AGENCY OFFUTT AFB NE

Contains weather forecasting techniques of interest to military meteorologists, in three chapters: surface weather elements, flight weather elements, and convective weather includes both general specific rules of thumb, results of research lessons learned from experience, etc gathered from military and other sources.