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vapor clouds

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[Solid Fuel-Gaseous Oxygen Reaction Techniques for Producing High Altitude Barium](#)

[Vapor Clouds](#)

Jan 1972 26 pages

Authors: [Jr. Allen Edward E.](#); [Philip E. Beaudoin](#); [SPACE DATA CORP TEMPE AZ](#)

The program was conducted to develop superior techniques for producing barium **vapor clouds** at high altitudes using sounding rockets. Several possible **vapor** production reactions are considered and thermochemical computations are performed comparing achievable efficiencies of yielding free barium at high temperatures. Several prime candidate reactions are evaluated for safety in use and practicality in reactor design. A reactor has been designed for future implementation. Thermochemical ...

Full Text

[Infrared Differential Absorption Lidar for Vapor Detection](#)

Feb 1988 37 pages

Authors: [J. P. Carrico](#); [K. R. Phelps](#); [J. van der Laan](#); [E. E. Uthe](#); [P. L. Holland](#); [SRI INTERNATIONAL MENLO PARK CA](#)

Ground-mobile and airborne carbon dioxide laser systems were developed to measure **vapor clouds** using differential absorption lidar (DIAL) techniques. Field testing with the ground-mobile lidar detected a **vapor** cloud at 7 km using the return signal from a topographic target at a range of 8.5 km. Range-resolved detection enabled mapping of **vapor** cloud concentration to a range of at least 1 km. The airborne lidar mapped vertically integrated, cross-cloud gas concentrations at 3 km and detected **vapor clouds** 7 km downwind from the **vapor** source. Keywords: Standoff detection, Remote detection.

Full Text

[Source Characterization of Heavy Gas Dispersion Models for Reactive Chemicals. Volume](#)

Dec 21, 1987 127 pages

1

Authors: [Phani K. Raj](#); [John A. Morris](#); [TECHNOLOGY AND MANAGEMENT SYSTEMS INC BURLINGTON MA](#)

... This report describes the mathematical models developed to described a variety of source types and the dispersion of **vapor clouds**/plumes in the atmosphere. Sixteen different source types are ... jet releases, explosive releases and releases of high **vapor** pressure liquids, cryogenic liquids and gases. Dispersion ... account the differences in source characteristics, high-than-air density of **clouds** (due to aerosol presence, temperature or molecular weight). Reactions of the chemicals, if any, ..th water **vapor** in the air are modeled and considered in the dispersion model. Transition ...

Full Text

[Laser Transmission Through Simulated Cirrus Clouds](#)

2001 88 pages

Authors: [Ila L. Kolb](#); [AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH](#)

Since approximately 20% of the globe is covered with cirrus **clouds** at any given time, it is clear that any airborne or spaceborne system using a laser will intercept cirrus **clouds** at some point. Cirrus **clouds** contain a very complex microphysical structure that will affect laser power by scattering and reflecting it away from the intended target, thus ... studies are performed on the laser transmission model to examine the effects of aerosols and water **vapor**, ice crystal orientation, multiple scattering contributions, and the differences between the single and ...

Full Text

[Raman Lidar Calibration for the DMSP SSM/T-2 Microwave Water Vapor Sensor](#)

Aug 2000 19 pages

Authors: [J. E. Wessel](#); [S. M. Beck](#); [Y. C. Chan](#); [R. W. Farley](#); [J. A. Gelbwachs](#); [AEROSPACE CORP EL SEGUNDO CA](#)

... Sands, Kauai, investigating Raman lidar as a method to improve calibration of the DMSP SSM/T-2 microwave water **vapor** profiling instrument. Lidar mixing ratios were calibrated against AIR and Vaisala radiosondes and the calibration was tested in the vicinity of **clouds**. Above 6 km, radiosondes reported anomalously low relative humidity in the vicinity of **clouds**. Lidar measurements were confirmed by using an electro-optical shutter, which provided correct measurement of relative humidity at cloud bases above 6 km. ...

Full Text

[Optical Measurements of NASA/USAF CRRES High Altitude Rocket Borne Chemical](#)

Oct 1992 32 pages

[Release Experiments in Conjunction with the USAF Airborne Ionospheric Observatory](#)

[Aircraft](#)

Authors: [W. P. Boquist](#); [B. G. Ledley](#); [TECHNOLOGY INTERNATIONAL CORP BEDFORD MA](#)

In order to provide post experiment optical imagery data for correlation of airborne measurements of satellite signal modification from intervening chemical **vapor clouds** released in the upper atmosphere, Technology International Corporation provided and operated as part of the NASA/USAF PL/ CRRES research program a ... third release (AA-2 event) occurred when the Grand Turk optics site was fully obscured by **clouds** for the duration of the normal period of visibility. All three rocket borne experiments were launched at morning twilight ...

Full Text

[Thermodynamic Feedback Between Clouds and the Ocean Surface Mixed Layer](#)

Mar 20, 1989 11 pages

Authors: [P. C. Chu](#); [Jr Garwood Roland W.](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA DEPT OF OCEANOGRAPHY](#)[Full Text](#)

A cloud-ocean planetary boundary layer (OPBL) feedback mechanism is presented and tested in this paper. Water **vapor**, evaporated from the ocean surface or transported by the large-scale air flow, often forms convective **clouds** under a conditionally unstable lapse rate. The variable cloud cover and rainfall may base positive and negative feedback with the ocean mixed layer temperature and salinity structure. The coupling of the ...

[Effects of Satellite Spectral Resolution and Atmospheric Water Vapor on Retrieval of Near-Ground Temperatures](#)

Apr 28, 1993 12 pages

Authors: [Alan E. Lipton](#); [PHILLIPS LAB HANSCOM AFB MA](#)[Full Text](#)

... the surface temperature errors tend to be smaller and the low-level air temperature errors tend to be larger. These values do not account for other sources of retrieval error, such as interference by **clouds**, uncertainty of the ground surface emittance, or deficiencies in the radiative transfer computation method. ANNOTATION: Reprint: Effects of Satellite Spectral Resolution and Atmospheric Water **Vapor** on Retrieval of Near-Ground Temperatures.

[Real-Time Data Collection Programs and Source Code for a Commercial Passive FTIR Remote Sensor](#)

Aug 1994 221 pages

Authors: [Robert Kroutil](#); [Michael Housky](#); [Gary S. Small](#); [EDGEWOOD RESEARCH DEVELOPMENT AND ENGINEERING CENTER ABERDEEN PROVING GROUND MD](#)[Full Text](#)

... in C language for an IBM PC using the DOS operating system allow one to collect and display data in a variety of formats useful for the environmental monitoring of **vapor clouds**. Software is described that enables the user to execute signal processing algorithms for the real-time analysis of interferograms. The programs collect data from the commercial interferometer and detect a **vapor** species using digital filters and pattern recognition methods. Source code and documentation describing all program functions are provided. ...

[Modeling the Multiphase Atmospheric Chemistry of Launch Clouds](#)

Mar 21, 2000 9 pages

Authors: [B. B. Brady](#); [L. R. Martin](#); [AEROSPACE CORP EL SEGUNDO CA](#)[Full Text](#)

The adaptation is described of a widely available subroutine library, originally developed to model chemical **vapor** deposition to model a plume of steam and hydrogen chloride gas that is released during solid rocket booster launches such as the Space Shuttle and the Titan IV. Hydrogen chloride is a very hygroscopic gas, and it tends to form an aerosol cloud from the water **vapor** in the atmosphere as well as from the steam released by engine combustion and launch deluge water. The aerosol cloud is the most difficult feature to model because it involves phase ...

[Target Detection in Multispectral Images using the Spectral Co-Occurrence Matrix and Entropy Thresholding](#)

Jan 26, 1995 15 pages

Authors: [Mark L. Althouse](#); [Chein-I. Chang](#); [EDGEWOOD RESEARCH DEVELOPMENT AND ENGINEERING CENTER ABERDEEN PROVING GROUND MD](#)[Full Text](#)

... related to entropy-based segmentations computed for the statistics of a spatial co-occurrence matrix. For detection of spectrally active targets such as chemical **vapor clouds** in multispectral or hyperspectral imagery, a spectral co-occurrence matrix is employed. Using the entropy of various regions of the matrix, thresholds can be ... spectral characteristics of the intended target. Experiments are presented that show the detection of a chemical **vapor** cloud in multispectral thermal imagery. Several manners of dividing the co-occurrence matrix into ...

[Modeling of Cloud/Radiation Processes for Tropical Anvils](#)

Nov 30, 1992 108 pages

Authors: [Q. Fu](#); [K. N. Liou](#); [S. K. Krueger](#); [UTAH UNIV SALT LAKE CITY CENTER FOR ATMOSPHERIC AND REMOTE SOUNDING STUDIES](#)[Full Text](#)

... tropics are covered by extensive cirrus cloud systems. Tropical cirrus **clouds** evolve during the life cycle of the mesoscale convective systems and are modulated by large-scale disturbances. Outflow cirrus **clouds** from tropical cumulonimbi appear to be maintained in a convectively active state by radiative flux gradients within the **clouds**, as suggested by Danielson (1982). Extensive anvils are likely to become radiatively ... convective fluxes which in turn would provide an upward flux of water **vapor** within the cloud. The additional moisture at cloud top levels would promote rapid ...

[Cloud Optical Depth Retrieval from Cloud Radar and Microwave Radiometer Measurements](#)

Nov 5, 2004 27 pages

Authors: [Paul R. Desrochers](#); [AIR FORCE RESEARCH LAB HANSCOM AFB MA SPACE VEHICLES DIRECTORATE](#)[Full Text](#)

Radar and microwave radiometer measurements of **clouds** were taken along the California Coast at Vandenberg AFB on 10 ... with Minuteman III and Titan II rocket launches. The purpose was to characterize the **clouds** to derive an estimate of the optical depth at the time of the launches. These ... effort at AFRL to detect rocket emissions through optically thick **clouds**. The instruments used were the Air Force Research Laboratory Ka-band (35 GHz) ... and a Radiometrics Corp. model WVQ-I500, 5-channel (22-30 GHz) water **vapor** profiling microwave radiometer. A variation of the technique developed by Frisch et al. ...

[New Techniques for Contrail Forecasting](#)

Aug 1993 37 pages

Authors: [Jeffrey L. Peters](#); [AIR WEATHER SERVICE SCOTT AFB IL](#)

[Full Text](#)

... rules that correlate synoptic- scale upward vertical motion with contrail formation. The results indicate significant improvement in contrail forecasting 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, Exhaust trails, **Vapor** trails.

[Multi-Sensor Improved Sea Surface Temperature \(MISST\) for GODAE](#)

Jan 1, 2004 7 pages

Authors: [Chelle L Gentemann](#); [Gary A Wick](#); [James Cummings](#); [Eric Bayler](#); [NAVAL RESEARCH LAB STENNIS SPACE CENTER MS OCEANOGRAPHY DIV](#)

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... notable advances in SST measurement. In addition to more frequent coverage for increased temporal resolution, these sensors permit the combination of highly complementary IR and MW retrievals. While **clouds**, aerosols, and atmospheric water **vapor** affect IR retrievals, these phenomena have little impact on MW retrievals. Characteristically, IR SST provides high spatial resolution (~1 km at nadir) but poorer coverage with the presence of **clouds**.

[Numerical Approximations of Selected Meteorological Parameters Related to Cloud](#)

Mar 1973 50 pages

[Physics.](#)

Authors: [Walter S. Nordquist Jr](#); [ARMY ELECTRONICS COMMAND WHITE SANDS MISSILE RANGE N MEX ATMOSPHERIC SCIENCES LAB](#)

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... and development technical rept., Nordquist, Walter S. , Jr; DA-1-T-061102-B-53-A1-T-061102-B-53-A-20ECOM5475(*meteorological phenomena, numerical analysis), **vapor** pressure, dew point, specific heat, **clouds**, approximation(mathematics), computer programs wet bulb temperature, latent heat, *cloud physics, fortran Methods of ... used in the solution of cloud physics problems. These parameters are latent heat, saturation **vapor** pressure, dew point and wet bulb temperatures, specific heat of liquid water, ...

[Image Detection Using Edge Extraction Algorithms](#)

Aug 1993 74 pages

Authors: [Chein-I Chang](#); [MARYLAND UNIV BALTIMORE](#)

[Full Text](#)

... , MPCM can be regarded as a progressive edge detection technique and a top-down gray-level triangle method, respectively. For **vapor** cloud detection, we are often interested in the detection of **clouds**. Without reconstructing the original image, progressive edge detection extracts edges of objects progressively from the most significant contours to ... turns out to be a better approach than existing entropic thresholding methods in most test images. Detection, Thermal image, **Vapor** cloud, Chemical imaging coding.

[FEASIBILITY STUDY FOR THE DEVELOPMENT OF A SMOKE TRACER FOR AN APDS](#)

Jul 1965 27 pages

[SHOT](#)

Authors: [David J. Edelman](#); [Seymour M. Kaye](#); [PICATINNY ARSENAL DOVER NJ FELTMAN RESEARCH LABS](#)

[Full Text](#)

A feasibility study of a smoke or **vapor** stream system to function in the nose cone of a fin-stabilized round was conducted. The conventional base-located system could not be used because (a) the round contained a discarding sabot mechanism, and ... of the missile. Hence, a persistent trail observable by daylight was needed. Titanium tetrachloride was tried because, on exposure to air, it forms dense white **clouds** of titanium hydroxide. However, the corrosive properties of this material made it difficult to package. Since calculations indicated that nose temperatures exceeding 300 deg C would be ...

[Strategic Laser Communications Program. Volume 1. Proceedings of the Navy/DARPA](#)

Jul 31, 1980 639 pages

[Fourth Technical Interchange Meeting, 25-27 March 1980](#)

Authors: [NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA](#)

[Full Text](#)

... for SLC uplink; Space-Based Laser--Status of blue-green discharge laser work at NRL, Efficient Raman conversion of XeCl laser into the blue-green region, Lead **vapor** conversion of an X-ray preionized XeCl laser, Excimer laser engineering development at LASL, UTRC blue-green laser research, Mercury bromide laser scaling approaches, ... beam excited blue-green XeF, and copper laser development; Channel Characterization--Downlink laser cloud propagation experiments, The temporal and spatial smearing of blue-green pulses in **clouds**, and Kauai cloud experiment measurements: O2 absorption techniques.

[Aircraft Observations of the Vertical Structure of Stratiform Precipitation Relevant to](#)

Jun 1993 10 pages

[Microwave Radiative Transfer](#)

Authors: [A. T. Chang](#); [A. Barnes](#); [M. Glass](#); [R. Kakar](#); [T. T. Wilheit](#); [PHILLIPS LAB HANSCOM AFB MA](#)

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... radiometers, mirror hygrometers, temperature probes, and PMS probes. On two occasions the aircraft ascended on a spiral track through stratiform precipitation providing an opportunity to study the atmospheric parameters. The assumptions concerning liquid hydrometeors, water **vapor**, lapse rate, and non-precipitating **clouds** were studied. Model assumptions seem to be supported by these observation.

[Optical Remote Sensing of the Atmosphere. Technical Digest 1993. Volume 5.](#)

Jun 1994 522 pages

[Postconference Edition](#)

Authors: [Jarus W. Quinn](#); [OPTICAL SOCIETY OF AMERICA WASHINGTON DC](#)

[Full Text](#)

The agenda of sessions includes water **vapor**, space & ground based remote sensing, **clouds** and ECLIP, winds, ozone, aerosols, spectroscopy and new developments.

[Retrieval of Tropospheric Profiles from IR Emission Spectra: Field Experiment and Sensitivity Study](#)

Jun 30, 1993 28 pages

Authors: [J. M. Theriault](#); [G. P. Anderson](#); [J. H. Chetwynd](#); [E. Murphy](#); [V. Tuner](#); [PHILLIPS LAB HANSCOM AFB MA](#)

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This presentation includes technical comparisons of different atmospheric modeling instruments. For this report, results of the DBIS (Double Input Beam Interferometer Sounder) were compared to models such as FASCOD3 and MODTRAN2/L. The goal of this project was the retrieval of atmospheric temperature and water **vapor** profiles and possibly over relevant information on **clouds** and aerosol properties from high resolution IR emission measurements with a ground-based interferometer.

[Comparison between Cross-Track and Conical Scanning Microwave Window Channels Near 90 GHz](#)

Aug 2000 15 pages

Authors: [J. E. Wessel](#); [D. J. Boucher](#); [AEROSPACE CORP EL SEGUNDO CA](#)

[Full Text](#)

... objective of this study was to determine the angular characteristics of the cross-track 92-GHz window channel of the SSM/T-2 microwave water **vapor** radiometer (T-2) over the ocean surface and to relate measurements from this instrument to corresponding 85-GHz window channel measurements from the ... model and provided a general relationship between 92-GHz SSM/T-2 and 85-GHz SSM/I signals, which is applicable in the absence of depolarization by rain, **clouds**, or severe sea surface roughness. Intercomparison between instruments, based on surface modeling, may be useful for instrumental calibration, it ...

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