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Utilization And Examination Of A Mass Consistent Wind Flow Model

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Publication Date
1983

Abstract
MATHEW, a mass consistent wind flow model is applied to given areas in Princeton and Windsor, Massachusetts for the purpose of determining wind flow fields in those areas and examining the HATIIEW program itself. The MATHEW model which was originated by Sherman at Lawrence Livermore Laboratories to give a three-component time-independent nondivergent wind velocity field. The model has been verified by its creators and is accepted as a valid method for calculating wind fields. A description of the model is given. The analytic foundation of the model is elucidated, the numerical technique is described and the architecture of the MATHEW progrm is documented. All other pertinent programs required to implement MATHEW are recognized. Input information required by the MATHEW progrm is divide in to two groups, input (physical data and input parameters (which define the grid structure used in MATHEW's numerical solution technique algorithm). The input parameters govern the way that the MATHEW model interprets input data. The relationship between input parameters and MATHEW's interpretation of input data is examined. The means by which MATHEW conditions input topographic data is demonstrated. MATHEW's input parameters are confined to lie within a given--range. Geometric, data and storage space limitations are defined and investigated. Five tests (which compare output runs) are performed. The output of a MATHEW run is an adjusted wind velocity field. Input and output isotach maps and topography maps of actual and conditioned contours are test results. Ths results are analysed visually and mathematically. Observation of the computational progression of MATHEW's solution algorithm is performed. Results from the mathematical analyses and algorithm inspection are presented. Conclusions which summarize all observations and visual analyses from Tests I thru V are presented. These conclusions, listed in Table 6 , define the relationship between input parameters and MATHEW'S interpretation of input data and determine MATHEW's geometric, data and stroage space limitations. A recommended schedule procedure (Table 7) for input parameter determination is given. The suggested schedule procedure coupled with the Conclusion Summary Table provides guidelines for the potential

MATHEW user, increases the facility of its use and enhances the viability of the model. A ll conclusions and observations are offered as an effective way to evaluate the merit of the model

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