

Table of Contents

Chapter 1 Introduction

- 1.1 Introduction to MM5 modeling system
- 1.2 The MM5 model horizontal and vertical grid
- 1.3 Nesting
- 1.4 Lateral boundary conditions
- 1.5 Non-hydrostatic dynamics versus hydrostatic dynamics
- 1.6 Four-dimensional data assimilation
- 1.7 Land-use category
- 1.8 Map projections and map-scale factors
- 1.9 Data required to run the modeling system

Chapter 2 TERRAIN

- 2.1 Purpose
- 2.2.1 Task of TERRAIN
- 2.2.2 Overview of TERRAIN
- 2.3 Input data
- 2.4 Data information
- 2.5 List of landuse/vegetation and soil category
- 2.6 Defining mesoscale domains
- 2.7 Interpolation
 - 2.7.1 Overlapping parabolic interpolation
 - 2.7.2 Cressman-type objective analysis
- 2.8 Adjustment
 - 2.8.1 Reset the nested boundary values
 - 2.8.2 Feedback
- 2.9 Fudging function
 - 2.9.1 Water body correction
 - 2.9.2 Land-use fudge
- 2.10 Script variables
- 2.11 Parameter statement
- 2.12 Namelist options
 - 2.12.1 Map background options
 - 2.12.2 Domain setting options
 - 2.12.3 Function options
 - 2.12.4 Land-use fudging options
 - 2.12.5 Skip the EZFUDGE over the boxes
 - 2.12.6 Heights of water bodies

Chapter 3 REGRID

- 3.1 Purpose**
- 3.2 Structure**
- 3.3 A schematic**
- 3.4 Input to pregrid**
- 3.5 Input to regridder**
- 3.6 Output to regridder**
- 3.7 Intermediate data format**
- 3.8 Pregrid tables**
- 3.9 Pregrid program functioning**
- 3.10 Data**
- 3.11 Other data**

Chapter 4 Little_r

- 4.1 Purpose of objective analysis**
- 4.2 Source of Observations**
- 4.3 Objective analysis techniques**
 - 4.3.1 Cressman scheme**
 - 4.3.2 Ellipse scheme**
 - 4.3.3 Banana scheme**
 - 4.3.4 Multiquadric scheme**
- 4.5 Quality control for observations**
 - 4.5.1 Quality control on individual reports**
 - 4.5.2 The ERRMAX test**
 - 4.5.3 The buddy test**
- 4.6 Surface FDDA option**
- 4.6 Plot utilities**

Chapter 5 INTERPF

- 5.1 Purpose**
- 5.2 INTERPF procedure**
- 5.3 Surface pressure computation**
- 5.4 Hydrostatic vertical interpolation**
- 5.5 Integrated mean divergence removal**
- 5.6 Base state computation**
- 5.7 Initialization of nonhydrostatic model**
- 5.8 Substrate temperature and the LOWBDY_DOMAINn file**

Chapter 6 MM5

- 6.1 Purpose**
- 6.2 Basic equations of MM5**
- 6.3 Physics options in MM5**
 - 6.3.1 Cumulus parameterizations**
 - 6.3.2 PBL scheme**

- 6.3.3 Explicit moisture scheme
- 6.3.4 Radiation scheme
- 6.3.5 Surface schemes
- 6.4 Interaction of parameterizations
- 6.5 Four Dimensional Data Assimilation (FDDA)
 - 6.5.1 Introduction
 - 6.5.2 FDDA method
 - 6.5.3 Uses of FDDA
- 6.6 Output from MM5

Chapter 7 INTERPB

- 7.1.1 Purpose
- 7.1.2 Interpb Procedure
- 7.2 Sea-level pressure computation
- 7.3 Vertical interpolation/extrapolation
- 7.4 Interpolation (non-hydrostatic)

Chapter 8 NESTDOWN

- 8.1 Purpose
- 8.2 NESTDOWN procedure
- 8.3 Base state computation
- 8.4 Horizontal interpolation
- 8.5 Vertical corrections after horizontal interpolation
 - 8.5.1 Temperature correction
 - 8.5.2 Horizontal-wind correction

Chapter 9 GRAPH

- 9.1 Purpose
- 9.2 An alternate

Chapter 10 Case Study

- 10.1 Objective
- 10.2 System configuration
- 10.3 Case details
- 10.4 Terrain and Land-use data
- 10.5 Objective analysis
- 10.6 Model output

Conclusion

Reference

Appendix 1. Glossary of symbols