

U.S. DEPARTMENT OF COMMERCE/ National Oceanic and Atmospheric Administration

OFCM



OFFICE OF THE FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

National Hurricane Operations Plan

FCM-P12-2004



Hurricane Isabel - 16 September 2003

Washington, DC
May 2004

THE FEDERAL COMMITTEE FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH (FCMSSR)

VADM CONRAD C. LAUTENBACHER, JR., USN (RET.) Chairman, Department of Commerce	MR. RANDOLPH LYON Office of Management and Budget
VACANT Office of Science and Technology Policy	MR. JAMES H. WASHINGTON Department of Transportation
DR. RAYMOND MOTHA Department of Agriculture	MR. ANTHONY LOWE Federal Emergency Management Agency Department of Homeland Security
BRIG GEN DAVID L. JOHNSON, USAF (RET.) Department of Commerce	DR. GHASSEM R. ASRAR National Aeronautics and Space Administration
MR. ALAN SHAFFER Department of Defense	DR. MARGARET S. LEINEN National Science Foundation
DR. ARISTIDES PATRINOS Department of Energy	MR. PAUL MISENCIK National Transportation Safety Board
DR. PARNEY ALBRIGHT Science and Technology Directorate Department of Homeland Security	MR. JACK R. STROSNIDER U.S. Nuclear Regulatory Commission
DR. ROBERT M. HIRSCH Department of the Interior	DR. GARY FOLEY Environmental Protection Agency
MR. RALPH BRAIBANTI Department of State	MR. SAMUEL P. WILLIAMSON Federal Coordinator

MR. JAMES B. HARRISON, Executive Secretary
Office of the Federal Coordinator for
Meteorological Services and Supporting Research

THE INTERDEPARTMENTAL COMMITTEE FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH (ICMSSR)

MR. SAMUEL P. WILLIAMSON, Chairman Federal Coordinator	MR. RICHARD HEUWINKEL (Acting) Federal Aviation Administration Department of Transportation
MR. THOMAS PUTERBAUGH Department of Agriculture	DR. JONATHAN M. BERKSON United States Coast Guard Department of Homeland Security
MR. JOHN E. JONES, JR. Department of Commerce	MR. JEFFREY MACLURE Department of State
RADM STEVEN J. TOMASZESKI, USN United States Navy Department of Defense	DR. S. T. RAO Environmental Protection Agency
BRIG GEN THOMAS E. STICKFORD, USAF United States Air Force Department of Defense	MR. JOHN GAMBEL Federal Emergency Management Agency Department of Homeland Security
MR. RICKEY PETTY Department of Energy	DR. RAMESH KAKAR National Aeronautics and Space Administration
MS. NANCY SUSKI Science and Technology Directorate Department of Homeland Security	DR. JARVIS MOYERS National Science Foundation
MR. LEWIS T. MOORE Department of the Interior	MR. DONALD E. EICK National Transportation Safety Board
MS. REGINA MCELROY Federal Highway Administration Department of Transportation	MS. LETA A. BROWN U.S. Nuclear Regulatory Commission
	MS. ERIN WUCHTE Office of Management and Budget

MR. JAMES B. HARRISON, Executive Secretary
Office of the Federal Coordinator for
Meteorological Services and Supporting Research

**FEDERAL COORDINATOR
FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH**

8455 Colesville Road, Suite 1500
Silver Spring, Maryland 20910

NATIONAL HURRICANE OPERATIONS PLAN

FCM-P12-2004

Washington, D.C.
May 2004

CHANGE AND REVIEW LOG

Use this page to record changes and notices of reviews.

Change Number	Page Numbers	Date Posted	Initial
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Changes are indicated by a vertical line in the margin next to the change or by shading and strikeouts.

Review Date	Comments	Initial

FOREWORD

The Interdepartmental Hurricane Conference (IHC) is sponsored annually by the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) to provide a forum for the responsible Federal agencies, together with representatives from the user communities like emergency management, to review the Nation's hurricane forecast and warning program and to make recommendations on how to improve the program in the future. The major objective is to plan and prepare for the upcoming hurricane season. The 58th IHC was held in Charleston, South Carolina, March 1-5, 2004, and the new procedures, procedural changes, and agreements reached at the conference were incorporated into this publication--the 42nd edition of the *National Hurricane Operations Plan* (NHOP).

At the 58th IHC, the Working Group for Hurricane and Winter Storms Operations and Research (WG/HWSOR) addressed six action items. Of the six, one was for information only, and four were closed through incorporation into the NHOP as approved recommendations and/or changes. In the remaining action item, the Tropical Prediction Center/National Hurricane Center (TPC/NHC) requested that the Fleet Numerical Meteorology and Oceanography Center (FNMOC) increase the run frequency to four times daily and extend the forecast period out to 126 hours for the GFDN model (the Navy version of the GFDL hurricane model) so that TPC/NHC could make greater use of the model. The Navy agreed to the request on a resources-permitting basis. The action items will be published on the OFCM web site at www.ofcm.gov.

This edition includes a number of minor revisions and changes to Chapter 3, *General Operations and Procedures of the National Weather Service Hurricane Centers*, and Chapter 5, *Aircraft Reconnaissance*. Chapter 6, *Satellite Reconnaissance*; Chapter 8, *National Data Buoy Capabilities and Requirements*; and Appendix A, *Local National Weather Service (NWS) Office Products*, were substantially updated.

The 2003 Atlantic tropical cyclone season was a record season which extended from April until December. Hurricane Isabel caused record flooding in upper Chesapeake Bay and major flooding along the North Carolina coast; Hurricane Fabian was the worst hurricane to hit Bermuda in over 75 years; and Hurricane Juan was the worst hurricane to hit Halifax, Nova Scotia, in its modern history. Tropical Storm Ana was the first Atlantic tropical storm on record in the month of April, and Tropical Storm Odette was the first storm on record to form in the Caribbean Sea in the month of December. Of particular note, Hurricane Isabel was an exceptionally long-lived storm that strengthened at one point to a Category 5 hurricane and resulted in 17 deaths and over \$3.37 billion in damage following landfall in North Carolina. The bottom line: Our multiagency tropical cyclone warning support system superbly responded to the challenges of this record-breaking season--a tribute to the professionalism, dedication, and cooperation of the civilian and military agencies involved.

Samuel P. Williamson
Federal Coordinator for Meteorological
Services and Supporting Research

NATIONAL HURRICANE OPERATIONS PLAN

TABLE OF CONTENTS

	Page
CHANGE AND REVIEW LOG	ii
FOREWORD	iii
TABLE OF CONTENTS	v
CHAPTER 1 INTRODUCTION	1-1
1.1. General	1-1
1.2. Scope	1-1
CHAPTER 2 RESPONSIBILITIES OF COOPERATING FEDERAL AGENCIES ..	2-1
2.1. General	2-1
2.2. DOC Responsibilities	2-1
2.3. DOD Responsibilities	2-4
2.4. DOT/DHS Responsibilities	2-5
2.5. Annual Liaison with Other Nations	2-5
2.6. Air Traffic Control/Flight Operations Coordination	2-6
CHAPTER 3 GENERAL OPERATIONS AND PROCEDURES OF THE NATIONAL WEATHER SERVICE HURRICANE CENTERS	3-1
3.1. General	3-1
3.2. Products	3-1
3.3. Designation of Tropical and Subtropical Cyclones	3-6
3.4. Transfer of Warning Responsibility	3-8
3.5. Alternate Warning Responsibilities	3-8
3.6. Abbreviated Communications Headings	3-13
3.7. Hurricane Liaison Team (HLT)	3-14
CHAPTER 4 NATIONAL WEATHER SERVICE PRODUCTS FOR THE DEPARTMENT OF DEFENSE	4-1
4.1. General	4-1
4.2. Observations	4-1
4.3. Tropical Cyclone Forecast/Advisories	4-1
CHAPTER 5 AIRCRAFT RECONNAISSANCE	5-1
5.1. General	5-1
5.2. Responsibilities	5-1
5.3. Control of Aircraft	5-3
5.4. Reconnaissance Requirements	5-3
5.5. Reconnaissance Planning and Flight Notification	5-6
5.6. Reconnaissance Effectiveness Criteria	5-19

5.7.	Aerial Reconnaissance Weather Encoding, Reporting, and Coordination	5-20
5.8.	Operational Flight Patterns	5-23
5.9.	Aircraft Reconnaissance Communications	5-26
CHAPTER 6	SATELLITE SURVEILLANCE OF TROPICAL AND SUBTROPICAL CYCLONES	6-1
6.1.	Satellites	6-1
6.2.	National Weather Service (NWS) Support	6-5
6.3.	NESDIS Satellite Analysis Branch (SAB)	6-5
6.4.	Air Force Support and the Defense Meteorological Satellite Program (DMSP)	6-6
6.5.	Satellites and Satellite Data Availability for the Current Hurricane Season	6-9
6.6.	Current Intensity and Tropical Classification Number	6-13
CHAPTER 7	SURFACE RADAR REPORTING	7-1
7.1.	General	7-1
7.2.	The WSR-88D	7-1
7.3.	Procedures	7-1
CHAPTER 8	NATIONAL DATA BUOY CAPABILITIES AND REQUIREMENTS	8-1
8.1.	General	8-1
8.2.	Requests for Drifting Buoy Deployment	8-2
8.3.	Communications	8-2
CHAPTER 9	MARINE WEATHER BROADCASTS	9-1
9.1.	General	9-1
9.2.	Global Maritime Distress and Safety System (GMDSS)	9-1
9.3.	Coastal Maritime Safety Broadcasts	9-2
9.4.	High Seas Broadcasts	9-2
9.5.	Additional Information	9-3
CHAPTER 10	PUBLICITY	10-1
10.1.	News Media Releases	10-1
10.2.	Distribution	10-1

APPENDIX A	LOCAL NATIONAL WEATHER SERVICE (NWS) OFFICE PRODUCTS	A-1
APPENDIX B	DEFINING POINTS FOR TROPICAL CYCLONE WATCHES/ WARNINGS	B-1
APPENDIX C	JOINT TYPHOON WARNING CENTER (JTWC) BULLETINS	C-1
APPENDIX D	FORMAT FOR NHOP/NWSOP FLIGHT INFORMATION FOR INTERNATIONAL AND DOMESTIC NOTAM ISSUANCE	D-1
APPENDIX E	SAFFIR-SIMPSON HURRICANE SCALE	E-1
APPENDIX F	OFFICIAL INTERAGENCY AGREEMENTS	F-1
APPENDIX G	RECCO, HDOB, MINOB, AND TEMP DROP CODES, TABLES, AND REGULATIONS	G-1
APPENDIX H	WSR-88D OPERATIONS PLAN FOR TROPICAL CYCLONE EVENTS	H-1
APPENDIX I	TELEPHONE AND TELETYPE LISTING	I-1
APPENDIX J	PHONETIC PRONUNCIATION LISTING	J-1
APPENDIX K	ACRONYMS/ABBREVIATIONS	K-1
APPENDIX L	GLOSSARY	L-1
APPENDIX M	DISTRIBUTION	M-1

LIST OF FIGURES

Figure		Page
1-1.	Tropical cyclone forecast centers' areas of responsibility	1-2
2-1.	Typhoon Pongsona, December 9, 2002	2-3
3-1.	HPC Public Advisory Product Format	3-4
3-2.	Aviation Tropical Cyclone Advisory Format	3-5
4-1.	Tropical cyclone forecast/advisory format	4-3
4-2.	Tropical cyclone public advisory format	4-4
5-1.	WC-130 Weather Reconnaissance Aircraft	5-2
5-2.	G-IV Weather Surveillance Aircraft	5-2
5-3.	NOAA P-3 Weather Surveillance Aircraft	5-3
5-4.	Vortex data message worksheet	5-8
5-5.	Supplementary vortex data message	5-9
5-6.	Example Vortex Data Messages (VDM) and Supplementary Vortex Data Messages (SVDM) for the WC-130H and WC-130J	5-13
5-7.	NHOP coordinated request for aircraft reconnaissance	5-14
5-8.	Tropical cyclone plan of the day format	5-15
5-9.	Mission evaluation form	5-21
5-10.	Flight pattern ALPHA	5-23
5-11.	Suggested patterns for investigative missions	5-24
5-12.	Schematic of aircraft-to-satellite data link for NOAA P-3 aircraft	5-27
5-13.	Schematic of aircraft-to-satellite data link for AFRC WC-130 aircraft	5-28
6-1.	The GOES satellite system	6-3
6-2.	Center fix data form and message format (satellite)	6-8
8-1.	Example Buoy and Float Deployment Pattern	8-5
A-1.	Hurricane Local Statement Format	A-5
A-2.	Inland Wind NPW Product Format	A-7
A-3.	Post-Tropical Cyclone Report Format	A-9
B-1.	Tropical Cyclone Break Points for the Northeast	B-3
B-2.	Tropical Cyclone Break Points for the Southeast	B-3
B-3.	Tropical Cyclone Break Points for the Gulf of Mexico	B-4
G-1.	Reconnaissance code recording form	G-2
G-2.	HDOB Description and Sample Messages	G-6
G-3.	MinOb Description and Sample Message	G-8
G-4.	Example TEMP DROP Message for Tropical Cyclones	G-15

LIST OF TABLES

Table		Page
3-1.	Atlantic Tropical Cyclone Names	3-9
3-2.	Eastern Pacific Tropical Cyclone Names	3-10
3-3.	Central Pacific Tropical Cyclone Names	3-11
3-4.	International Tropical Cyclone Names for the Western Pacific and South China Sea	3-12
5-1.	Requirement for aircraft reconnaissance data	5-6
5-2.	Vortex data message entry explanation	5-10
6-1.	Communications headings for satellite tropical weather discussion summaries	6-7
6-2.	Satellite and satellite data availability for the current hurricane season	6-9
6-3.	The empirical relationship between the C.I. number and the maximum wind speed and the relationship between the T-number and the minimum sea-level pressure	6-13
7-1.	Participating radar stations	7-2
8-1.	Moored buoy locations and configurations	8-3
8-2.	C-MAN sites	8-4
8-3.	Code forms for moored data buoys, C-MAN stations, and drifting buoys	8-6
G-1.	Reconnaissance code tables	G-3
G-2.	Reconnaissance code regulations	G-5
G-3.	HDOB Message Format	G-7
G-4.	NOAA MinOb Message Format	G-9
G-5.	TEMP DROP code	G-10