Welcome to:

Hurricane Wind Field Research: How can HRD assist our WFO partners?

May 12-13, 2005: Hurricane Research Division, AOML, Miami FL

identification

2:00 Identify common issues

2:15 Timed Brainstorm

2:45 Consensus building

3:00 Agreed Strategy

3:15 Break

3:30 **Mesonets and portable mesonets:** Shirley Murillo, HRD

3:45 Dave Sharp: Results of interest based WFO problem definition and interest identification

4:00 Identify common issues

4:15 Timed Brainstorm

4:45 Consensus building

5:00 Agreed Strategy

5: 15 Icebreaker at RSMAS Commons

NOAA Hurricane Research Division

Photo: Brad Smull

part of the NOAA's Oceanic and Atmospheric Research
Atlantic Oceanographic and Meteorological Laboratories
Virginia Key, Miami FL (about 20 miles east of the Tropical Prediction Center)

Resources: 30 scientists and support staff from NOAA and University of Miami Cooperative Institute for Marine and Atmospheric Studies, regional lab with oceanographic expertise, proximity to RSMAS

NOAA Hurricane Research Division Mission

- **Improve Intensity Forecasts***
  - Objectively assess intensity and uncertainty
  - Assess intensity forecast accuracy
  - Contribute to development of next generation models
- **Diagnose and Predict Hurricane Impacts***
  - Real-time wind analysis for damage projection and assessment
  - Wind research and wind field reconstruction
  - Risk modeling
- **Improve track forecasts**
- **Understand climate variability**

You can help us to see how we can direct existing and future research programs towards helping to solve your problems

We will do the best we can with limited resources

Top 5

Issue WFO->	EYW	MIA	TBW	MLB	JAX	TLH	MOB	SJPR	Totals
NDFD issues and possible solutions	5	2	1	2	3	3	2	1	19
Realtime Meso Analysis	1	1	4	2	2	1	1	8	20
experimental research products to WFOs	3	1	5	5	1	5	7	2	29
Mesonets and portable mesonets	2	3	3	1	7	1	9	3	29
Uncertainty of wind estimates	4		6	3	4	1	6	6	30
Analysis of record for extreme events	6		6	2	8	2	5	7	36
Post event wind field documentation	7		6	6	6	2	4	4	35
Model wind field forecast verification	9		6	4	5	4	3	5	36
Gust factor research	8		6	3	9	1	8	9	44
ASOS Vulnerability			2						

1. NDFD:
Rachel Gross, Charlie Paxton; Mark Powell

2. Realtime meso analysis:
Jeff Medlin, Matt Strahan, Pablo Santos; Mark Powell

3. Exp. research products to WFOs:
Pablo Santos, Peter Wolf; Frank Marks

4. Mesonets and portable mesonets:
Dave Sharp. Irv Watson; Shirley Murillo

5. Uncertainty of wind estimates:
Irv Watson, Scott Spratt; Eric Uhlhorn

Interest Based Problem Solving

1. *Define the problem: "How might we...*

2. *Break down each problem and list interests of each WFO, HRD, identify common interests*

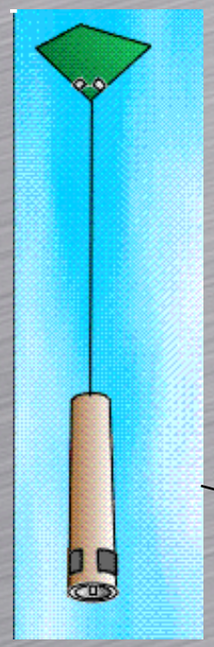
3. *Set performance standards as a basis for success*

4. *Generate alternatives and new ideas (timed brainstorming) for solving the problem*

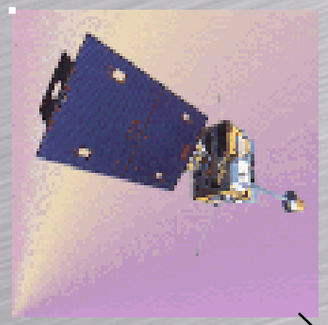
5. *Discuss pros/cons and reach consensus on solution*

6. *Write up the solution*

H*Wind Observing Platforms



GPS dropwindsondes



Geostationary (GOES) satellite data

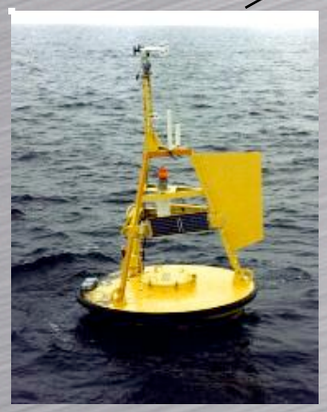
Polar Orbiting
QSCAT, TM/I, and SSM/I satellites data

Air Force and NOAA Aircraft

Stepped Frequency Microwave Radiometer (SFMR)

Database

Coastal Marine Automated Network (CMAN)



NOAA Buoys

Drifting buoys

Ship reports

Automated Surface Observing System (ASOS)

Mesonets

H*Wind
Demo
Hurricane Frances

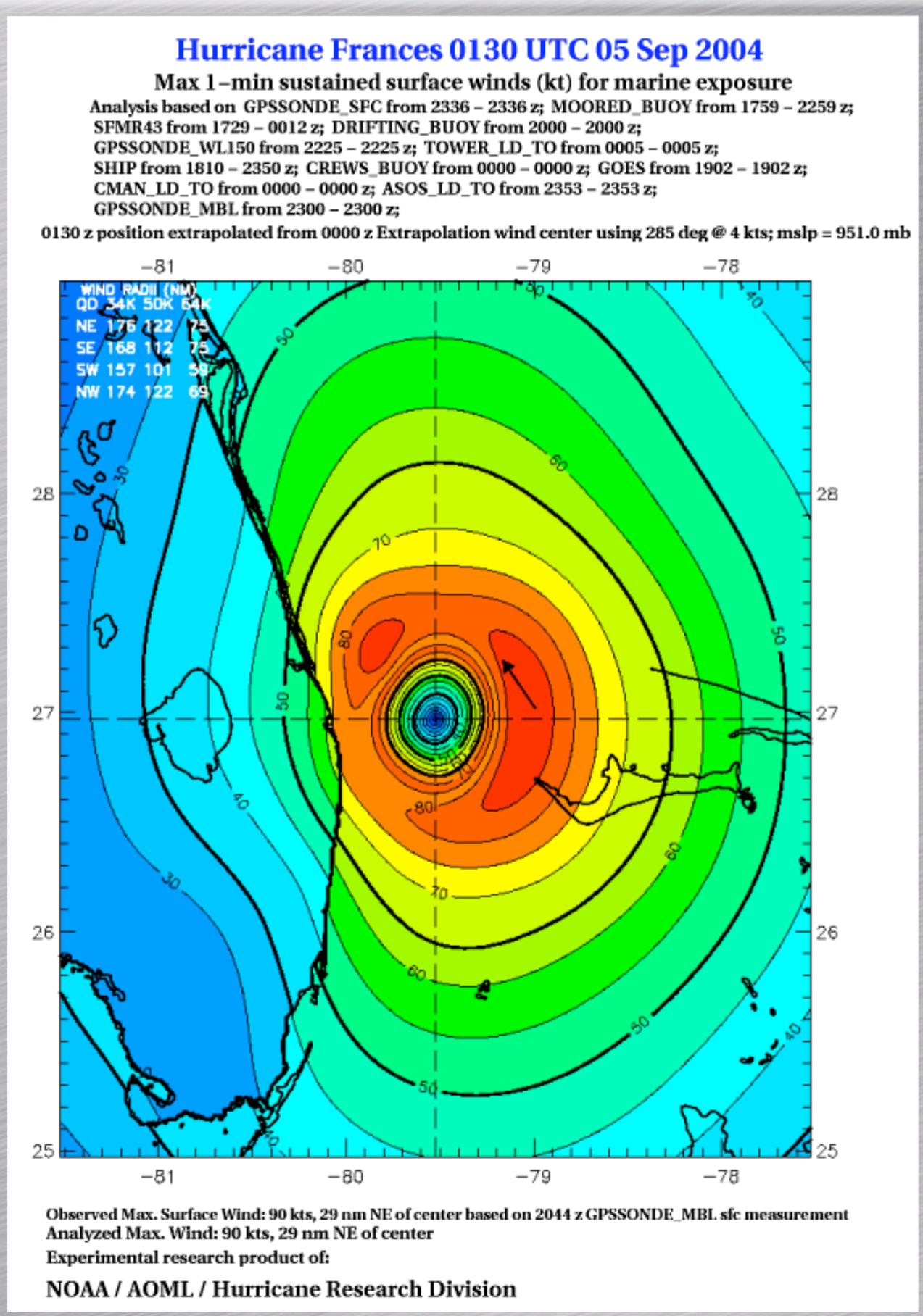
*H*Wind Analysis Research Product*

Snapshot of the sustained wind field

Assumes conditions representative over a 3-6 hour time period

Winds over land are for open terrain
Not valid for complex terrain

Winds over water are for marine exposure



*H*Wind Experimental Wind Swath Product*

Swath of the maximum sustained winds

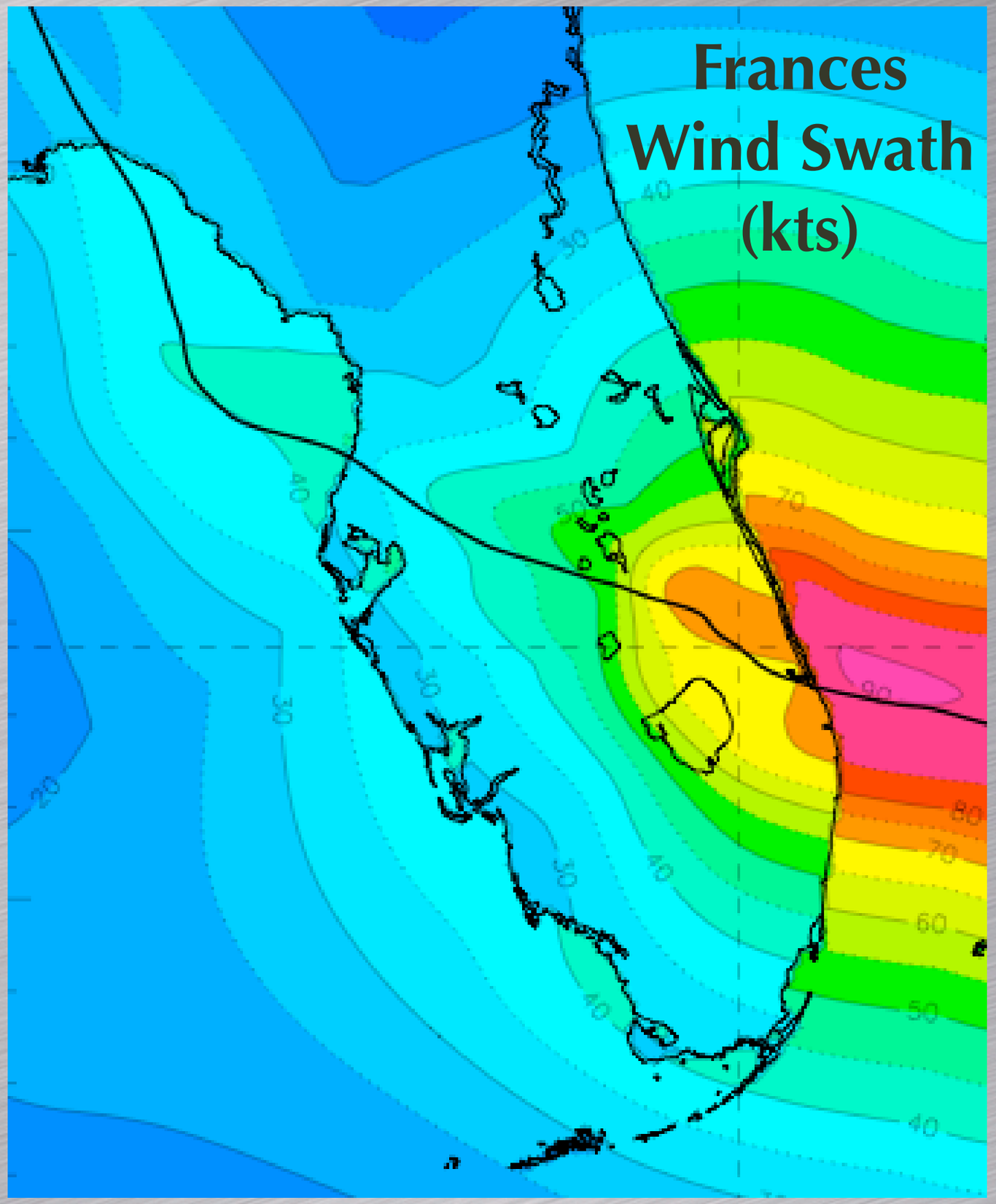
Winds over land are for open terrain

Designed for damage assessment support; also in shape file format

Uses landfall analysis and applies HRD inland decay model

Preliminary indications:
Decay too rapid
Model needs revision for Florida

Future:
With a robust observing network a decay model would not be required…
Real-time observations would provide instant updates to a swath map



NDFD: Potential HRD efforts

- Deterministic projections of wind field along official track (decay built in)
- Corrections to open terrain over land
- Peak gusts for open terrain
- Geographic forecast error
- Ensemble forecast landfall spread
- Forecast grid verification; Analysis of record for hurricane events
- Bring expertise/analysis of advanced observing systems to the WFOs
  - SFMR, Airborne Doppler, GBVTD, GPS sondes, Aerosondes
- Possible products for actual/complex terrain (with University partners)
- Graphical interactive QC of observations -> Objective analysis
- Grid point wind exceedance probability from peturbing the track according to geog. dependent forecast errors: hundreds of possible tracks

Real-time Mesoscale Ananlysis: Potential HRD efforts

- **H*Wind**
  - Bring expertise/analysis of advanced observing systems to the WFOs
    - SFMR, Airborne Doppler, GBVTD, GPS sondes, Aerosondes, mobile mesonets
  - Archival record of event “Analysis of record”
  - Gridded fields, color contour images, and GIS products from analyses
    - Graphical interactive QC of observations -> Objective analysis
    - Conversion from marine to open terrain
    - Data processed to standard framework: height, avg. time, exposure
- Gust factors f (Zo, time)
- Possible corrections for actual/complex terrain (with University partners)