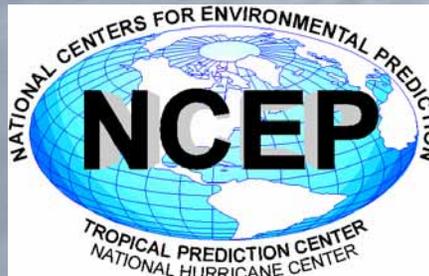


2005 NHC Verification Report

Interdepartmental Hurricane Conference 20 March 2006

James L. Franklin
NHC/TPC

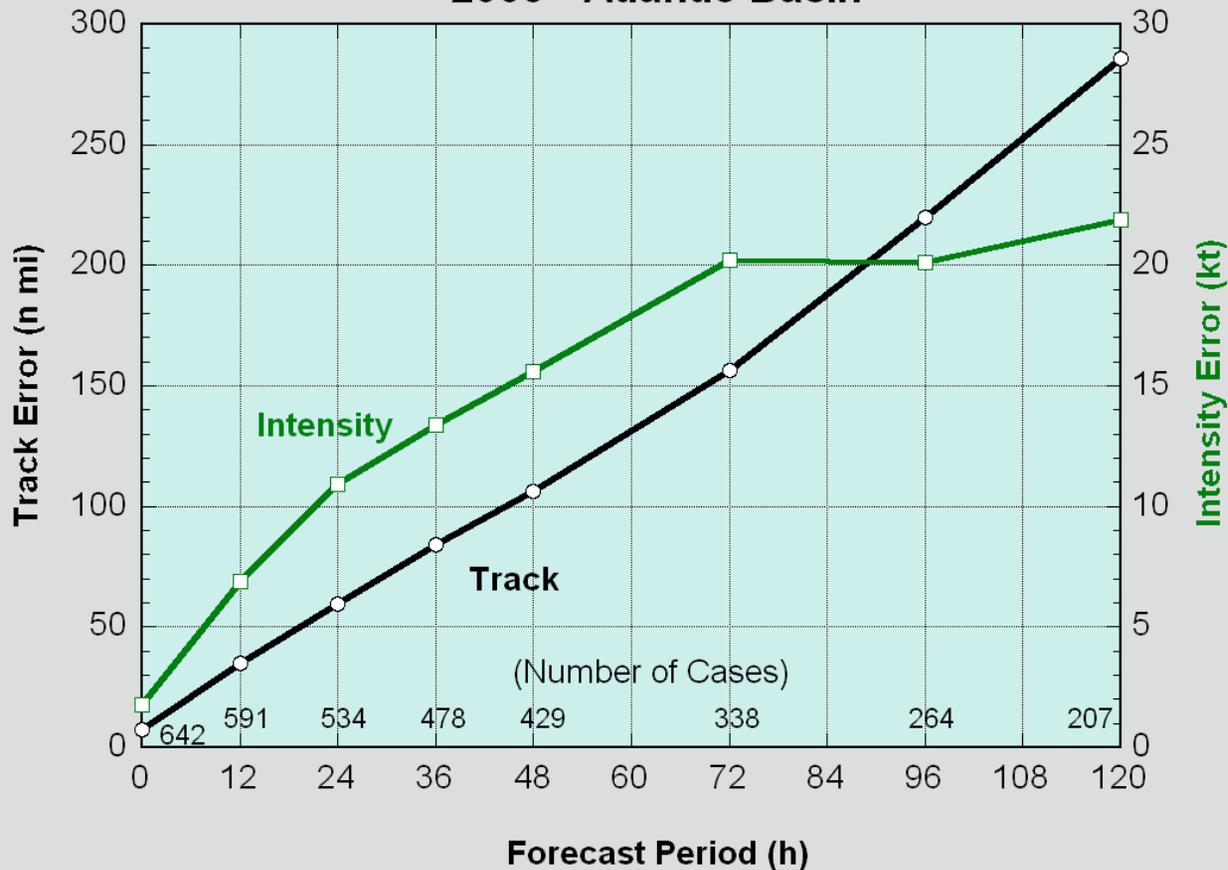


Verification Rules

- System must be a tropical (or subtropical) cyclone at both the forecast time and verification time.
- Includes depression stage (except as noted).
- 2005 verification includes forecasts for Zeta during 2006.
- **Special advisories ignored; regular advisories verified (NEW for 2005).**
- Final verification for Atlantic (probably), eastern Pacific still preliminary.
- **Skill baselines are revised CLIPER5 (updated developmental data to 1931-2004 [ATL] and 1949-2004 [EPAC]) and SHIFOR5 models, run post-storm on operational compute data (OCS5). Negative SHIFOR5 forecasts set = 1 kt.**

2005 Atlantic Verification

**NHC Official Forecasts
2005 - Atlantic Basin**



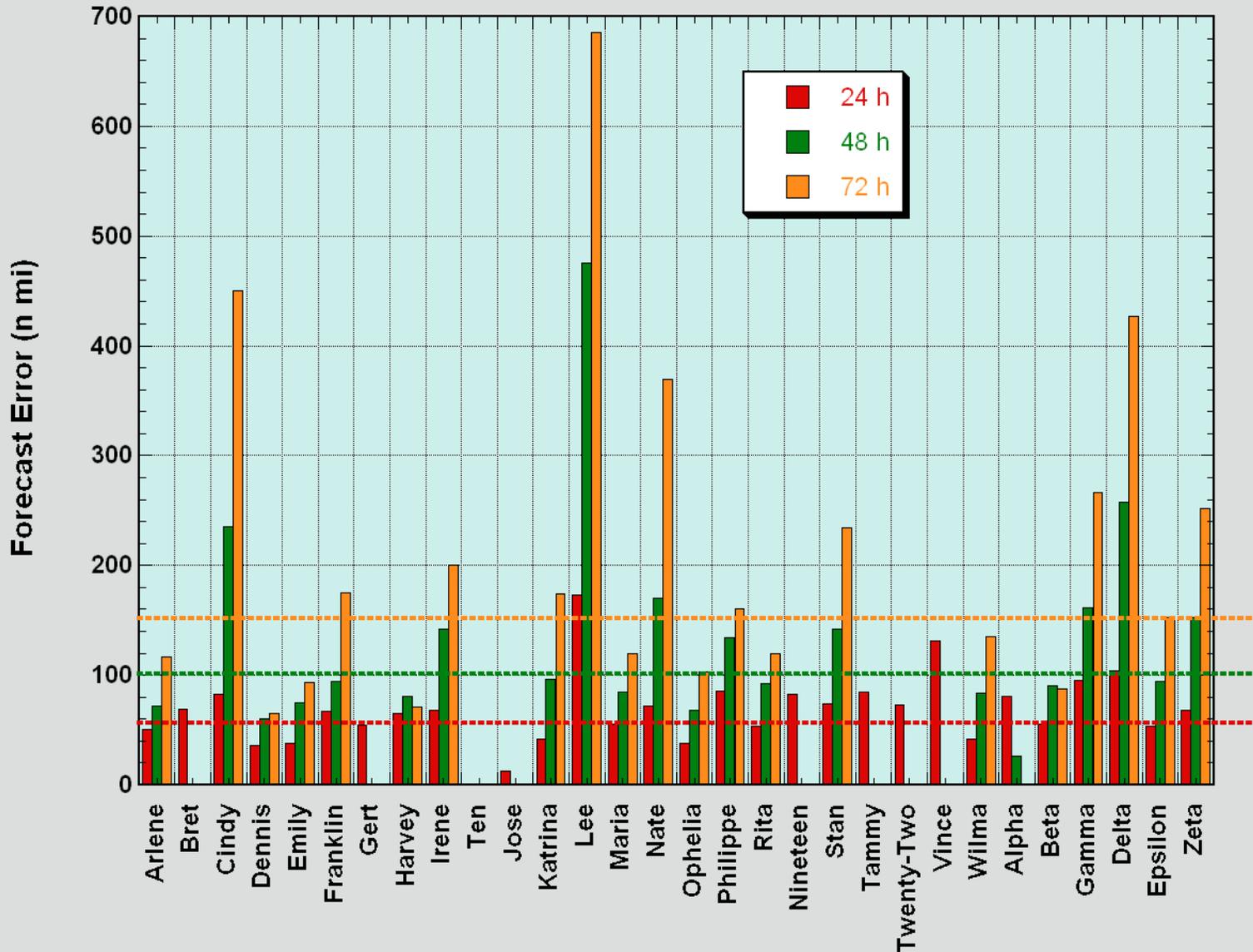
VT (h)	N	Trk (n mi)	Int (kt)
000	642	7.5	1.8
012	591	35.1	6.9
024	534	59.7	10.9
036	478	84.1	13.4
048	429	106.4*	15.6
072	338	156.2	20.2
096	264	219.8	20.1
120	207	285.6	21.9

Values in green meet or exceed all-time records.

* 48 h track error for TS and H only was 101 n mi; GPRA goal was 128 n mi.

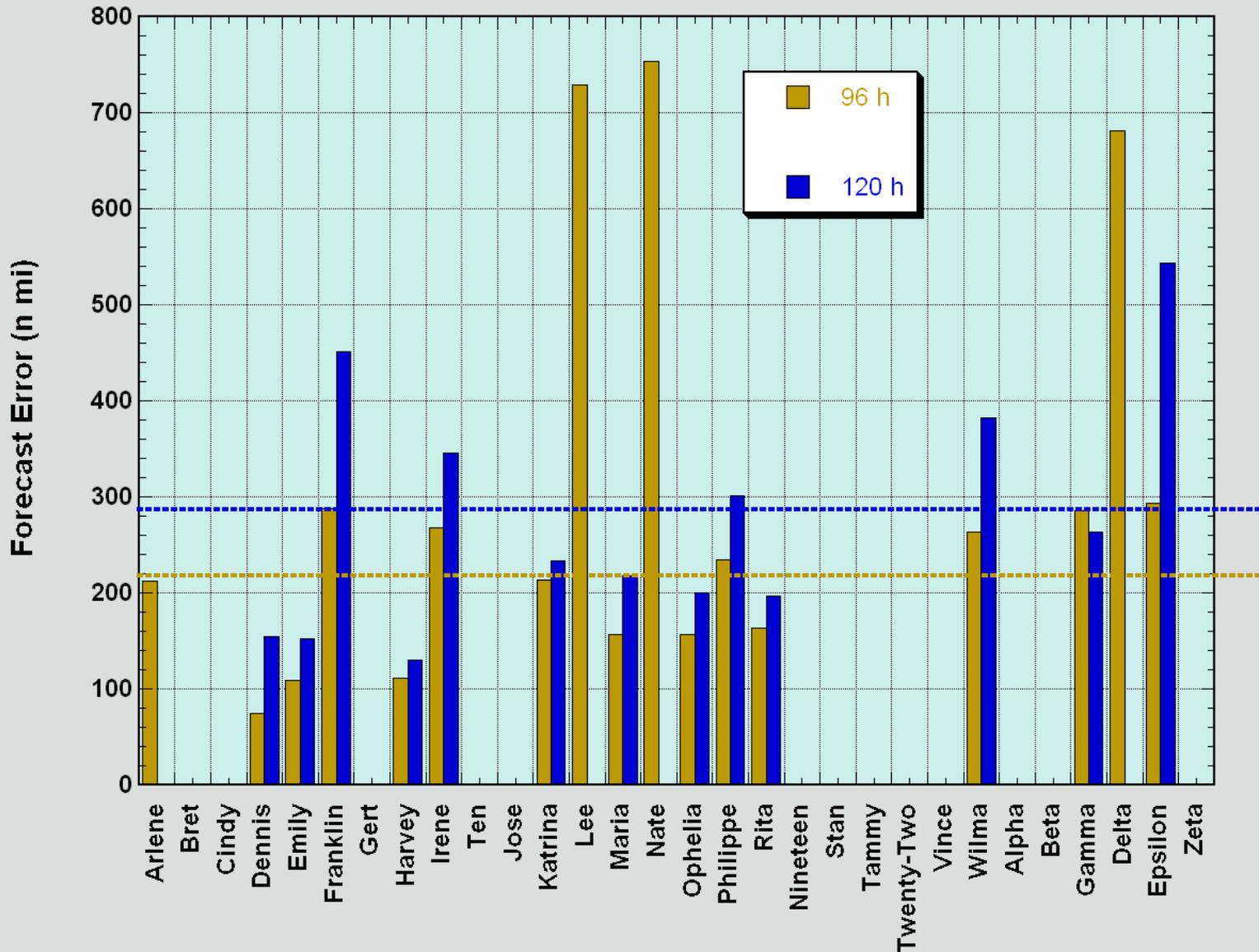
Track Errors by Storm

NHC Official Track Forecasts
2005 - Atlantic Basin



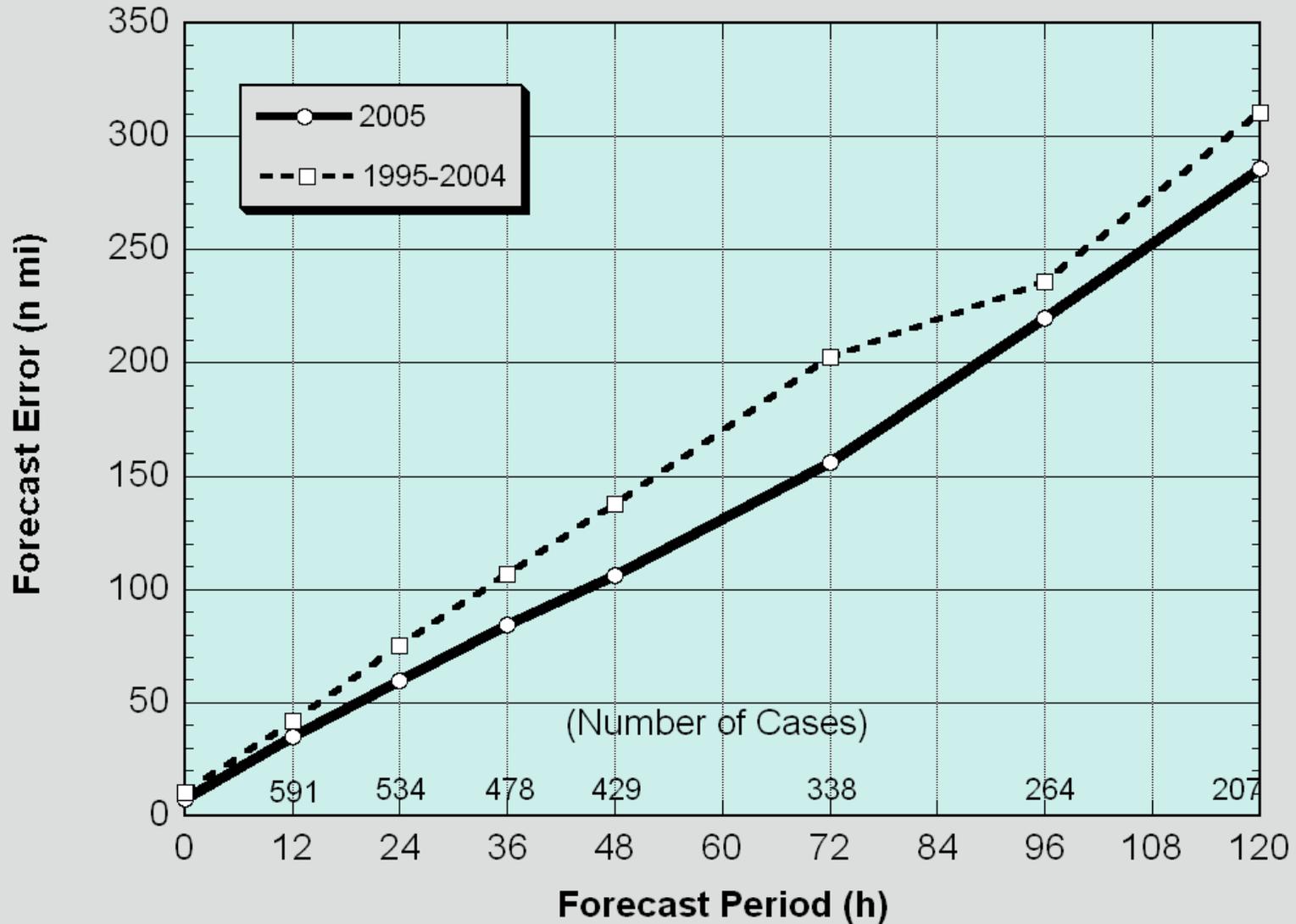
Track Errors by Storm

NHC Official Track Forecasts
2005 - Atlantic Basin



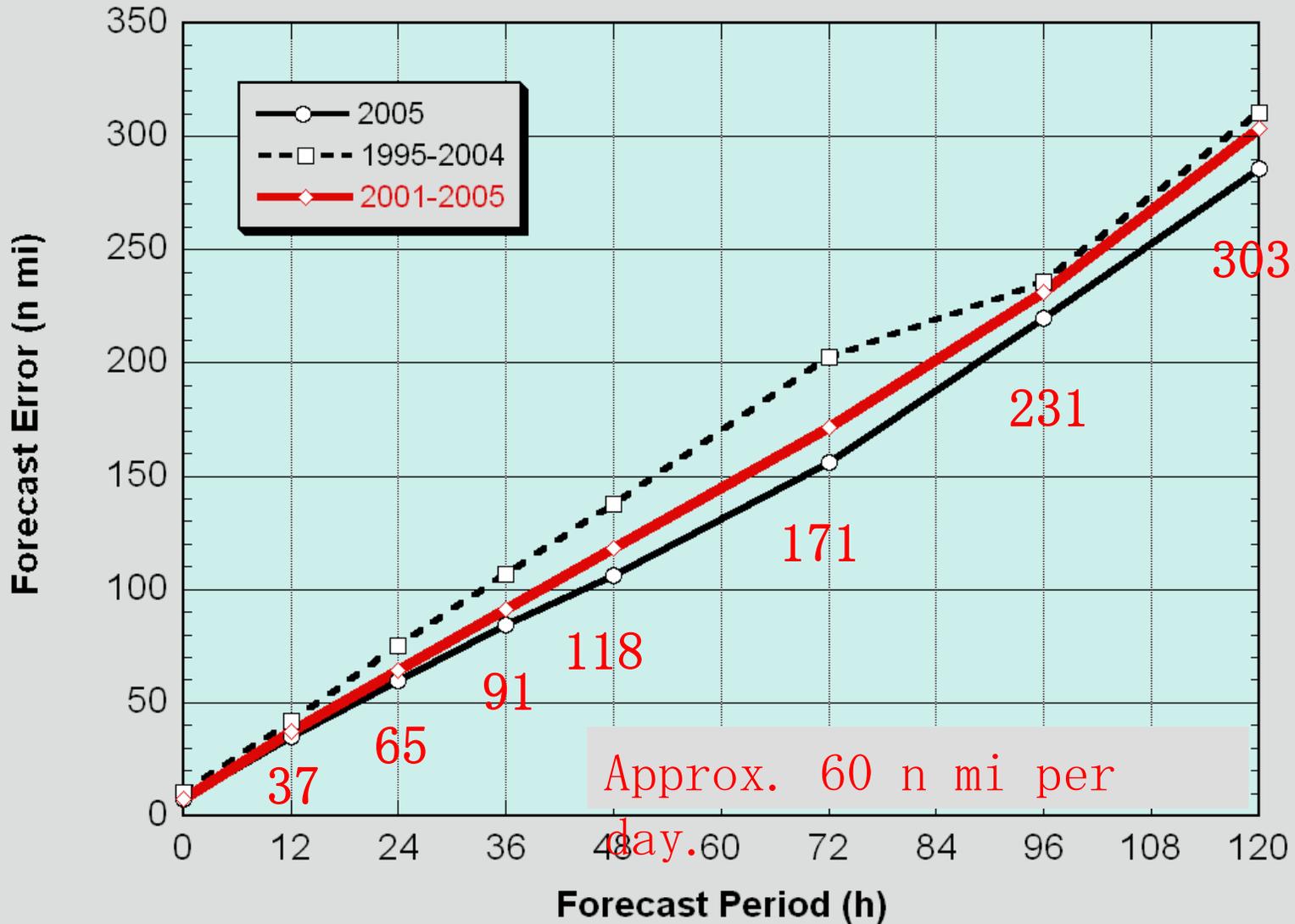
2005 vs. Long-Term Mean

NHC Official Track Forecasts Atlantic Basin



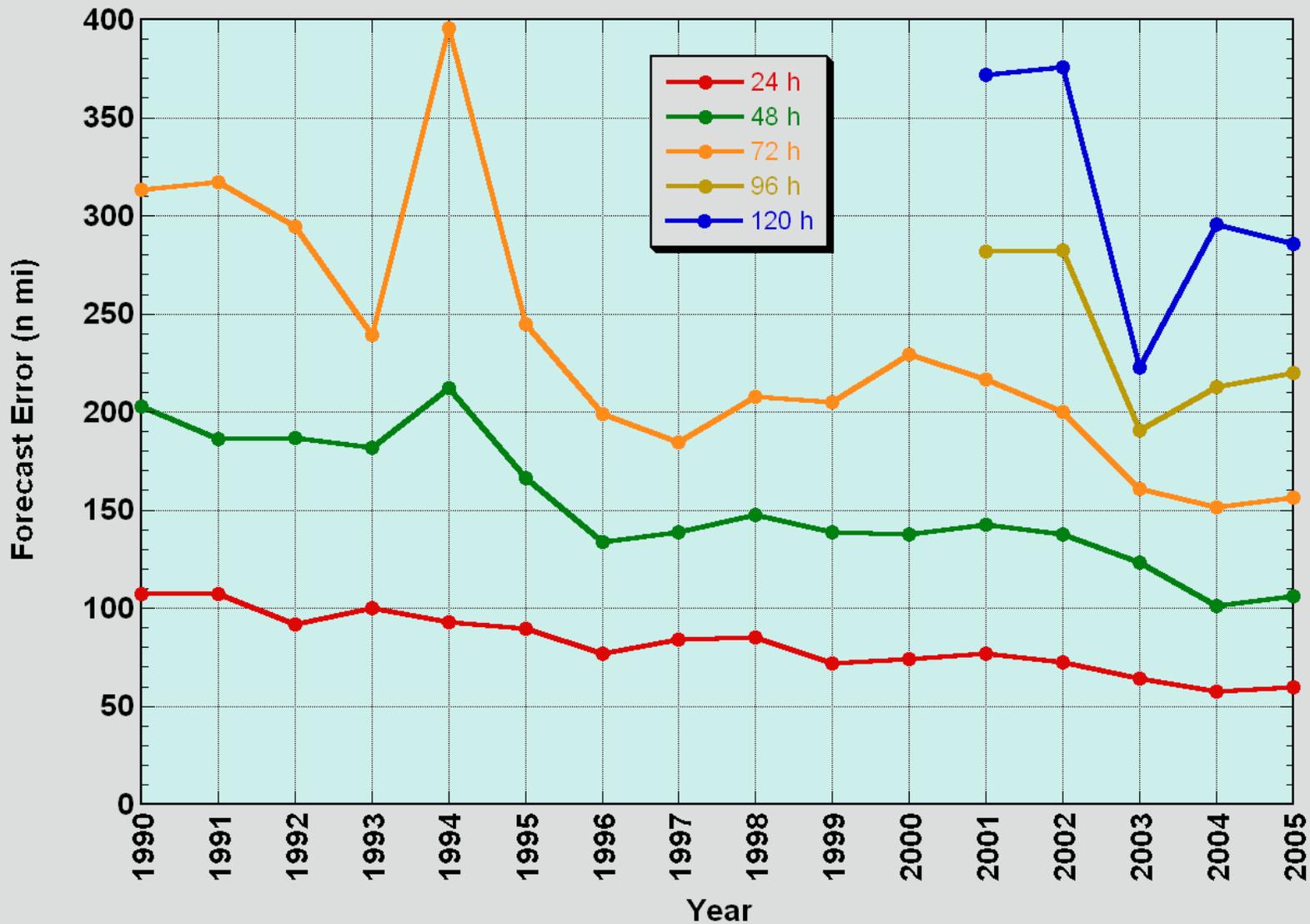
Meet the New Long-Term Mean

NHC Official Track Forecasts Atlantic Basin



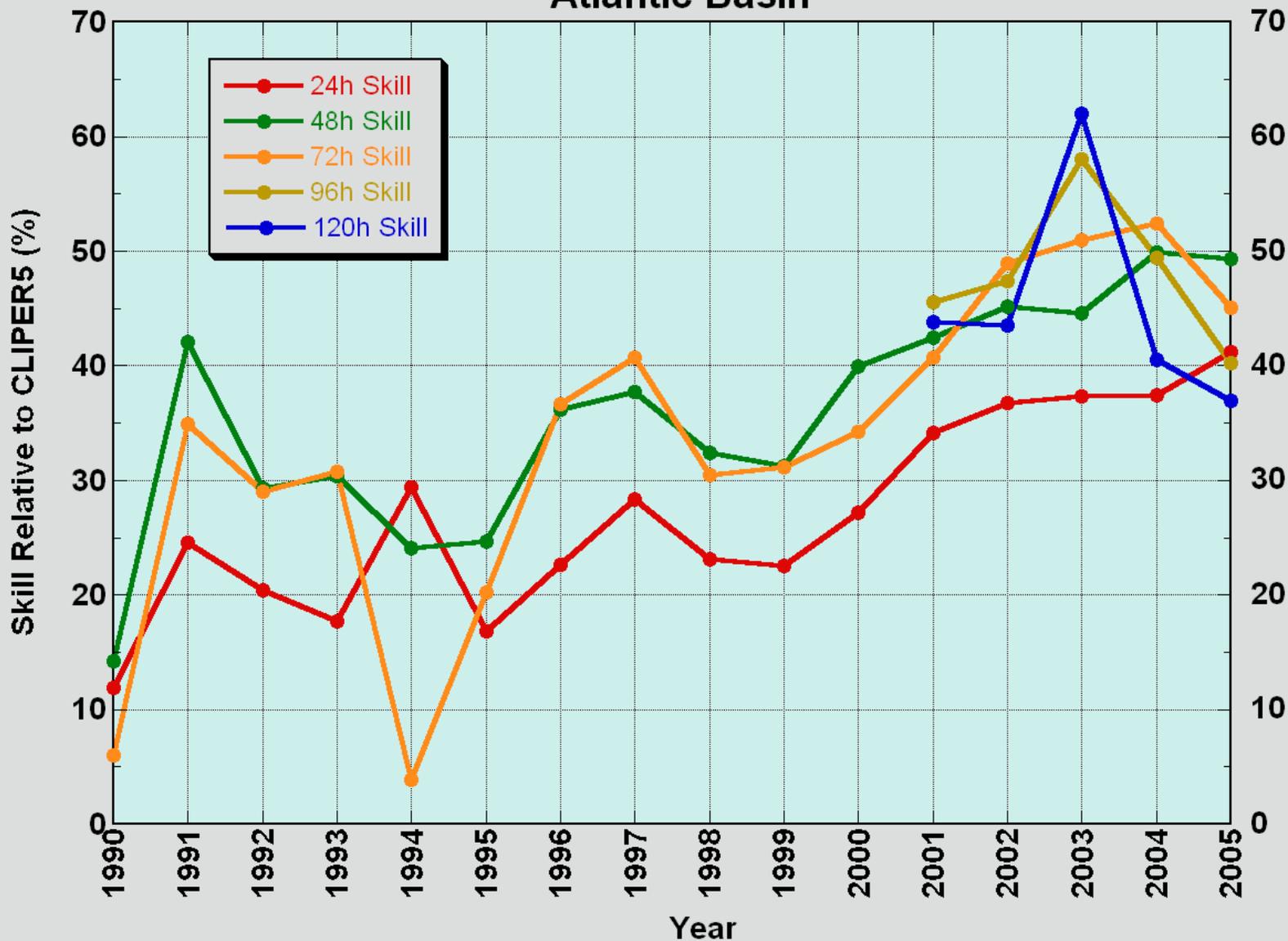
Errors cut in half in 15 years

NHC Official Track Error Trend
Atlantic Basin



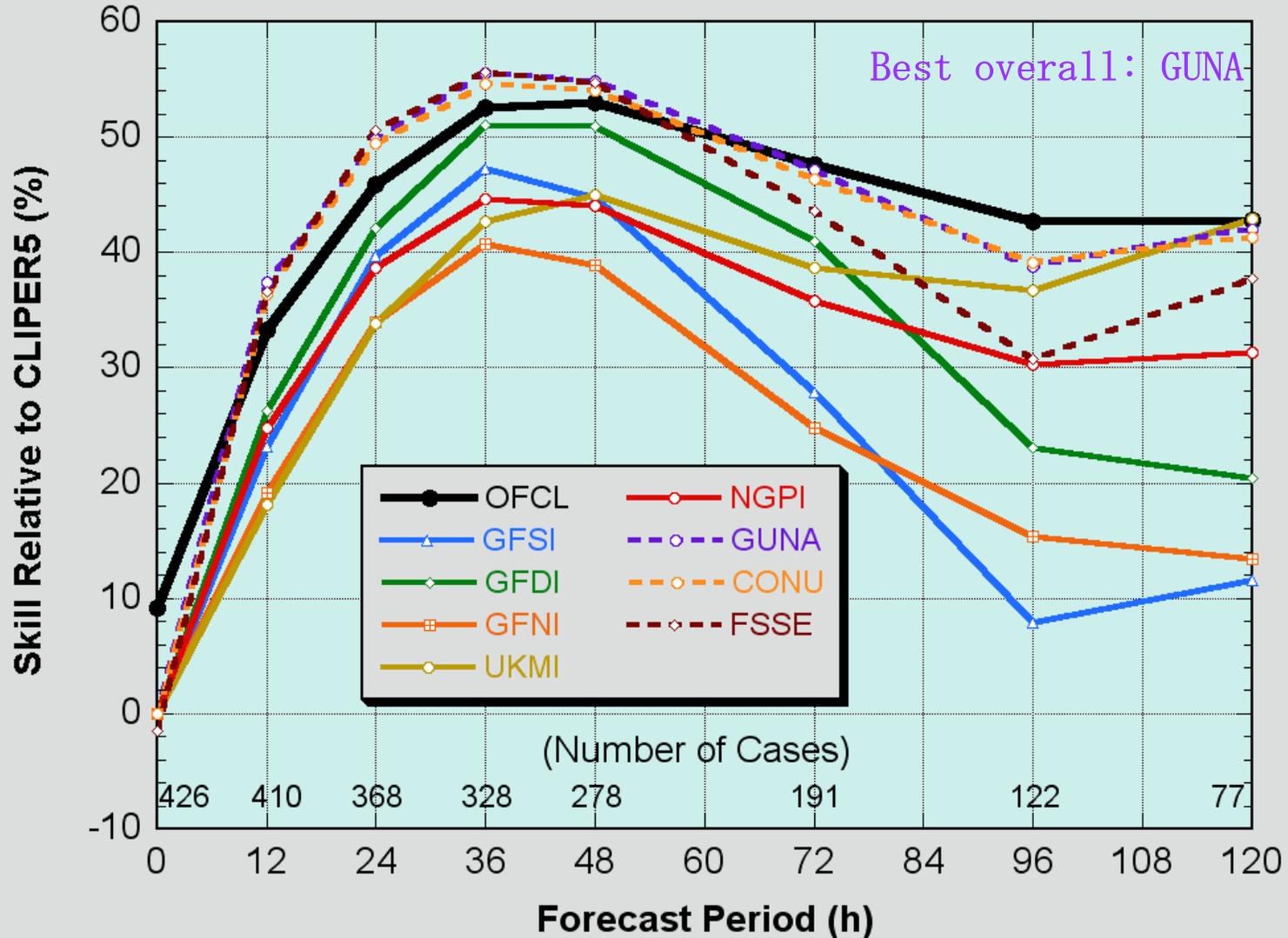
Plateau of Skill Continues

NHC Official Track Skill Trend
Atlantic Basin



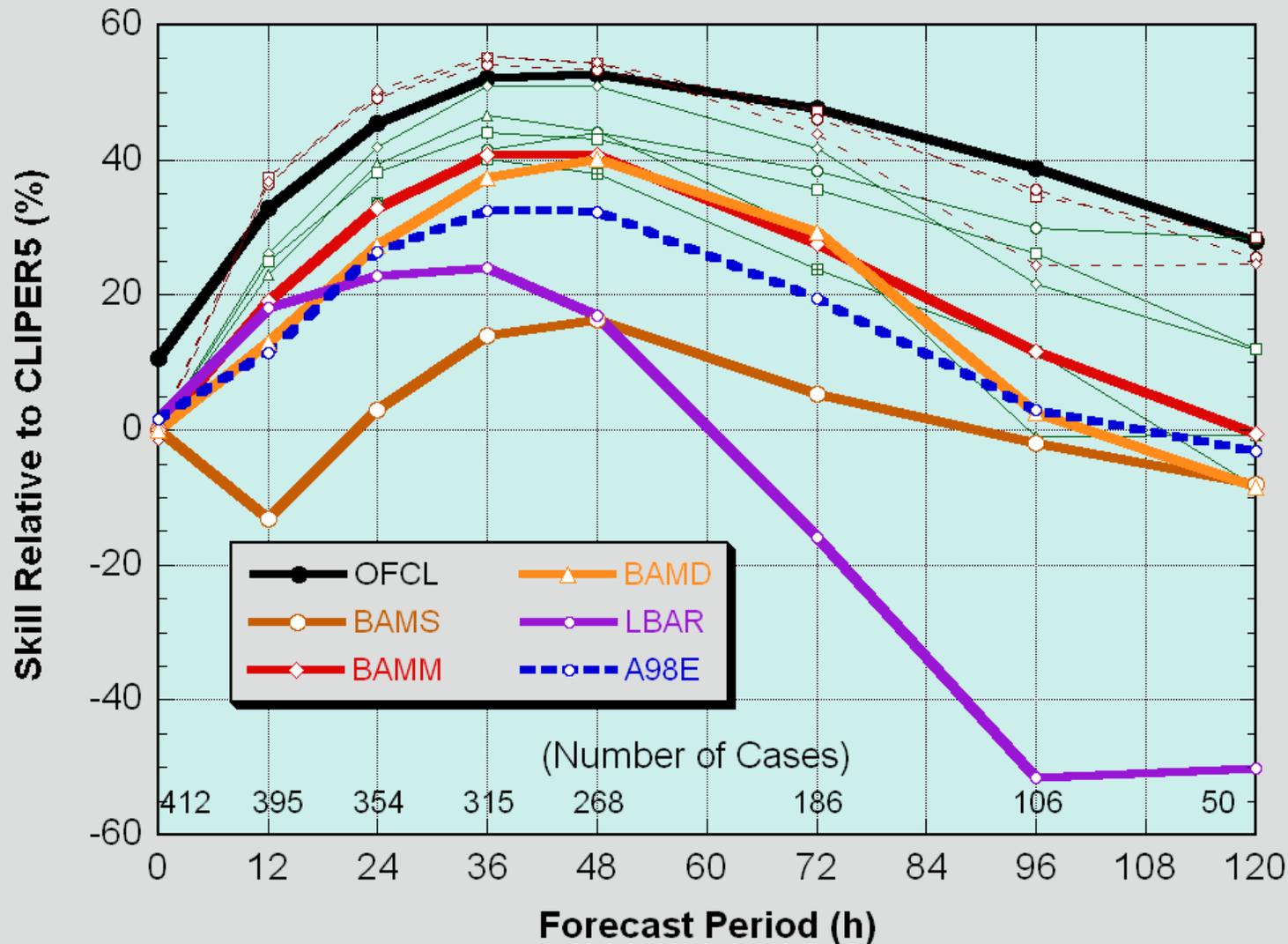
2005 Track Guidance (1st Tier)

Track Forecast Skill (Early Models) 2005 - Atlantic Basin



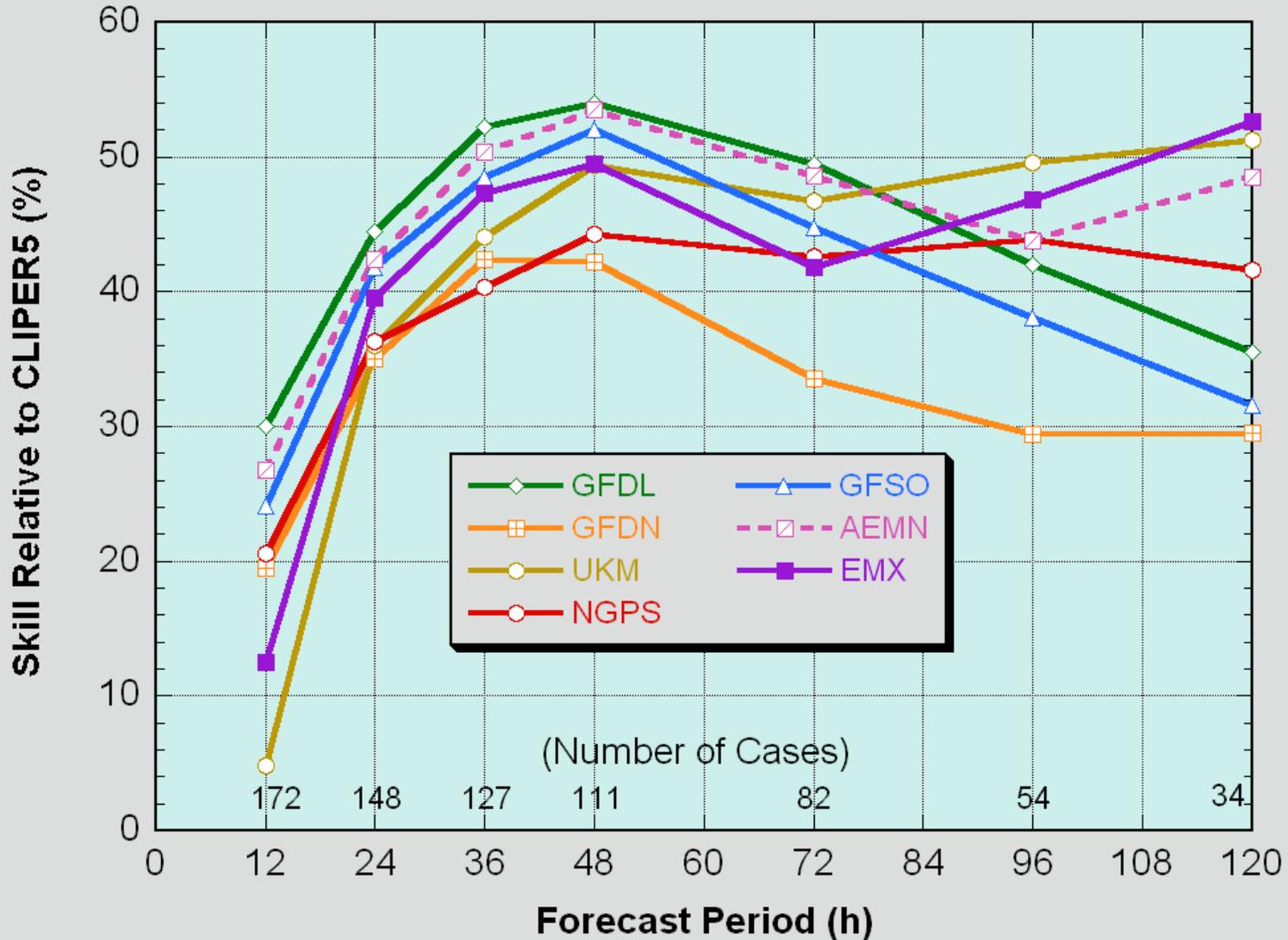
2nd Tier Early Models

Track Forecast Skill (Early Models) 2005 - Atlantic Basin



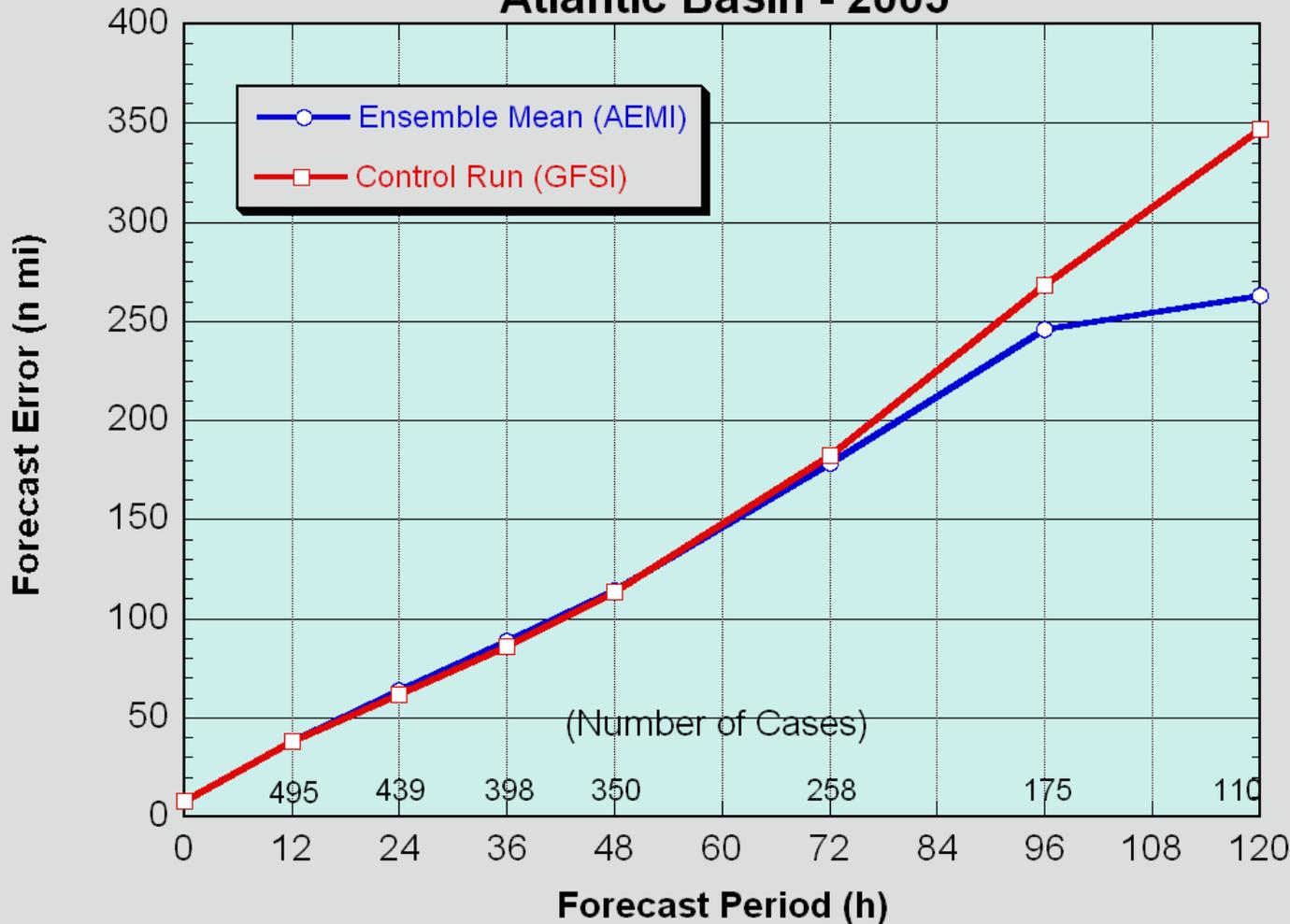
2005 Late Models

Track Forecast Skill (Late Models) 2005 - Atlantic Basin



GFS Ensemble Mean

GFS vs GFS Ensemble Mean Track Forecasts Atlantic Basin - 2005



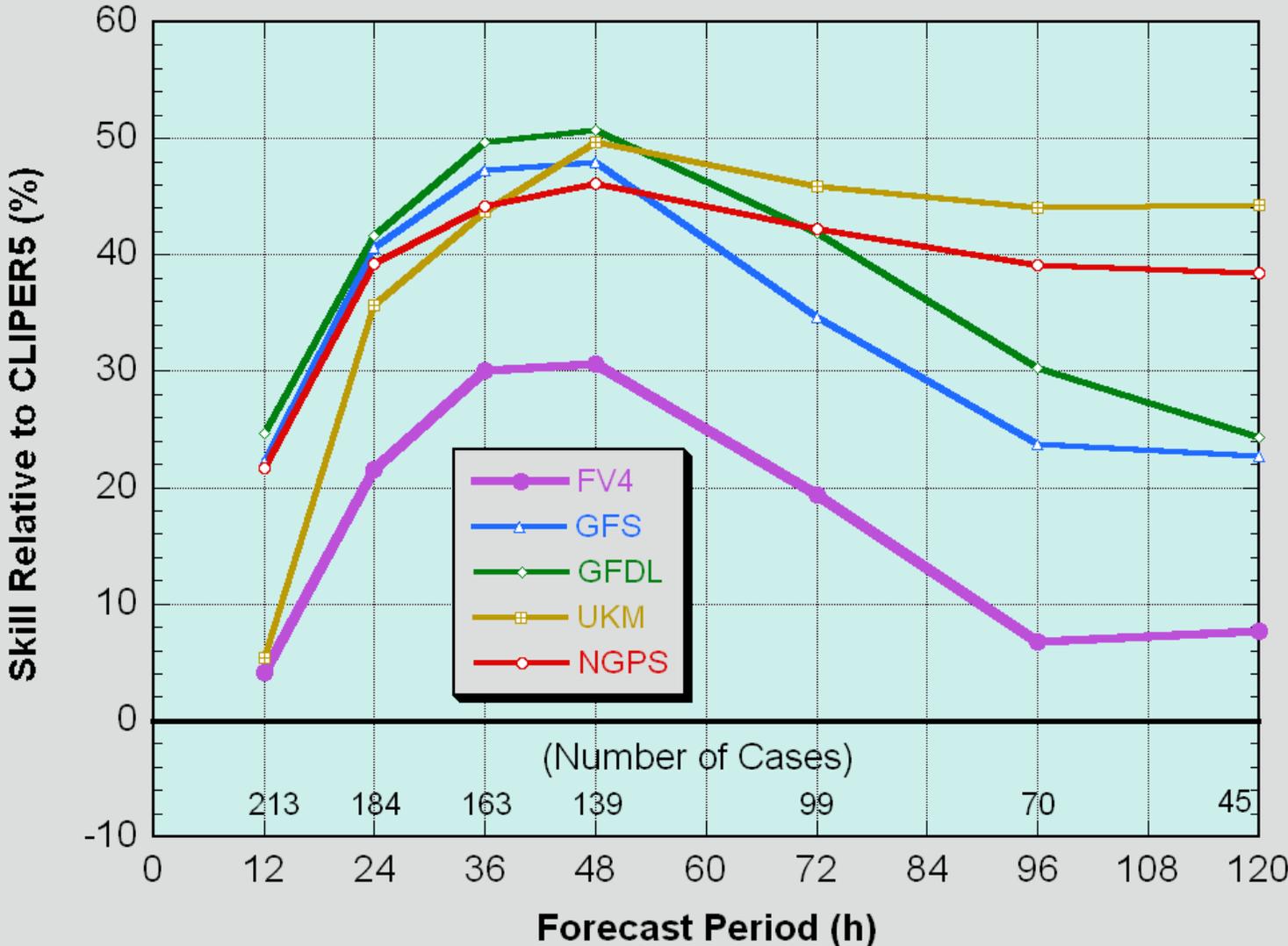
Relocation applied to ensemble members beginning 12Z 16 August, although there was no detectable change in AEMI performance.

AEMI beat GFSI 66% of the time at 5 days.

88% availability at 5 days, relative to GFSI.

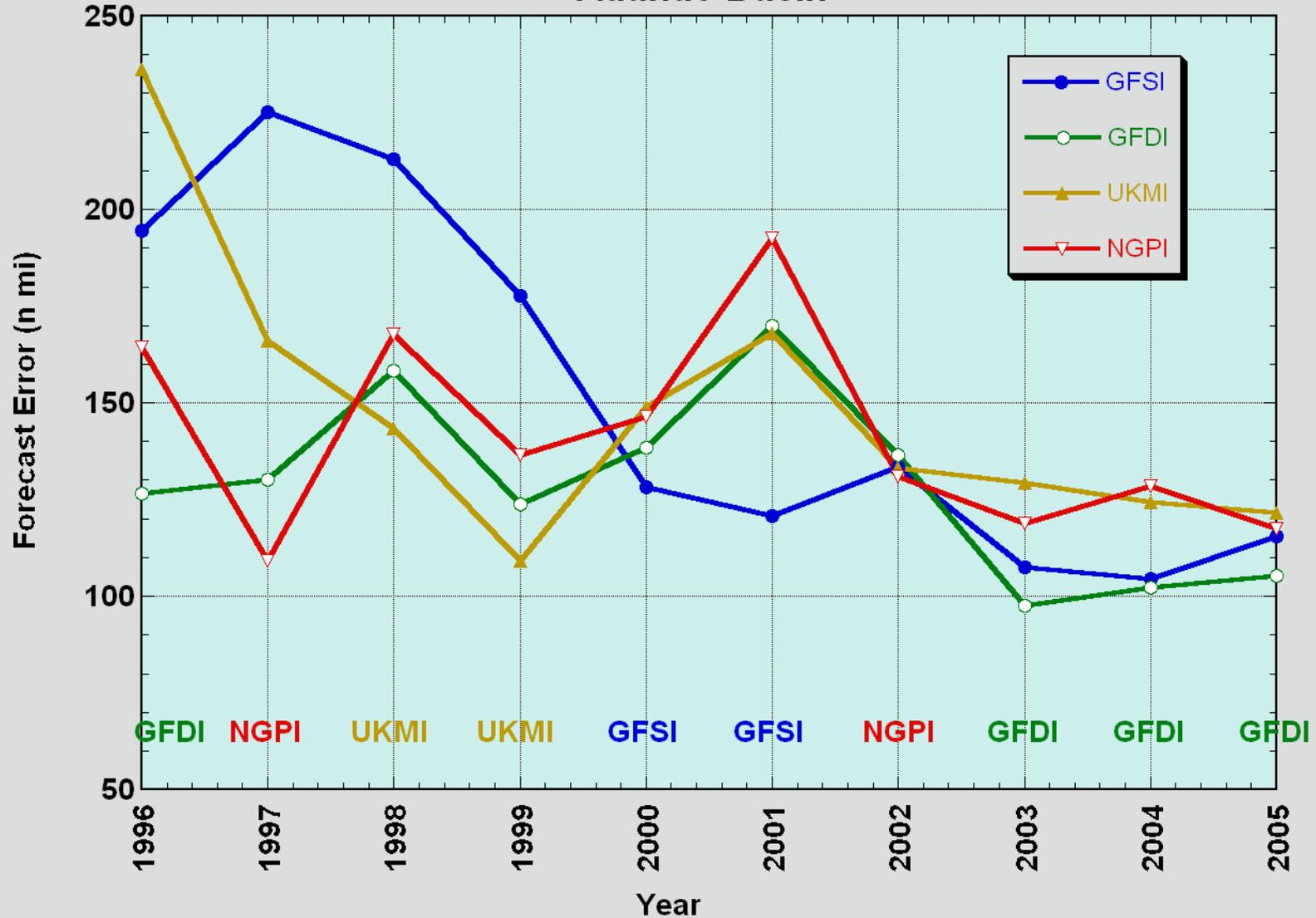
Experimental NASA Model

NASA FV4 Track Forecast Skill 2005 - Atlantic Basin



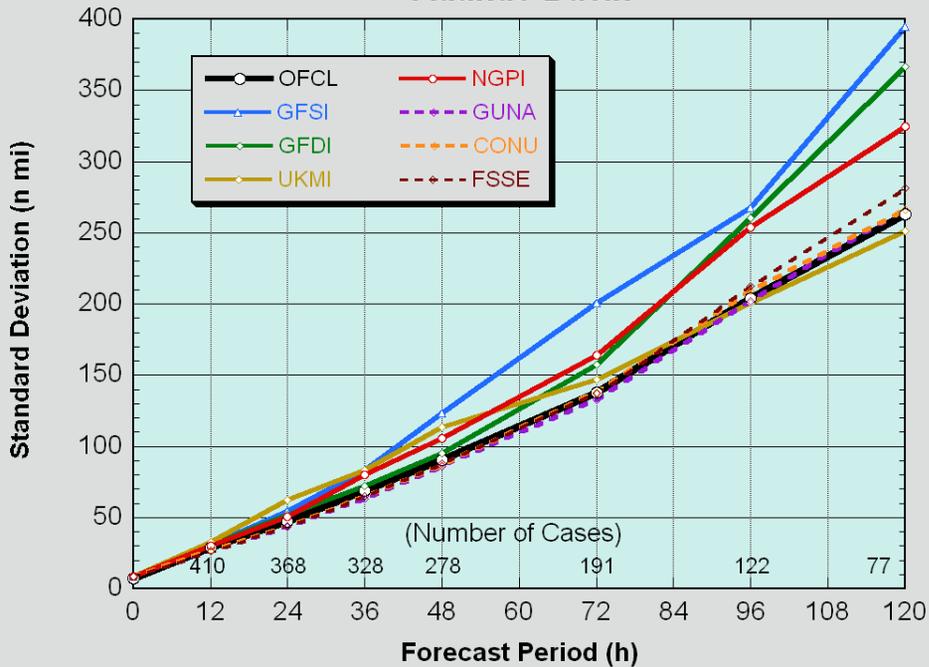
Guidance Trends

48-h Track Forecast Guidance Trends Atlantic Basin

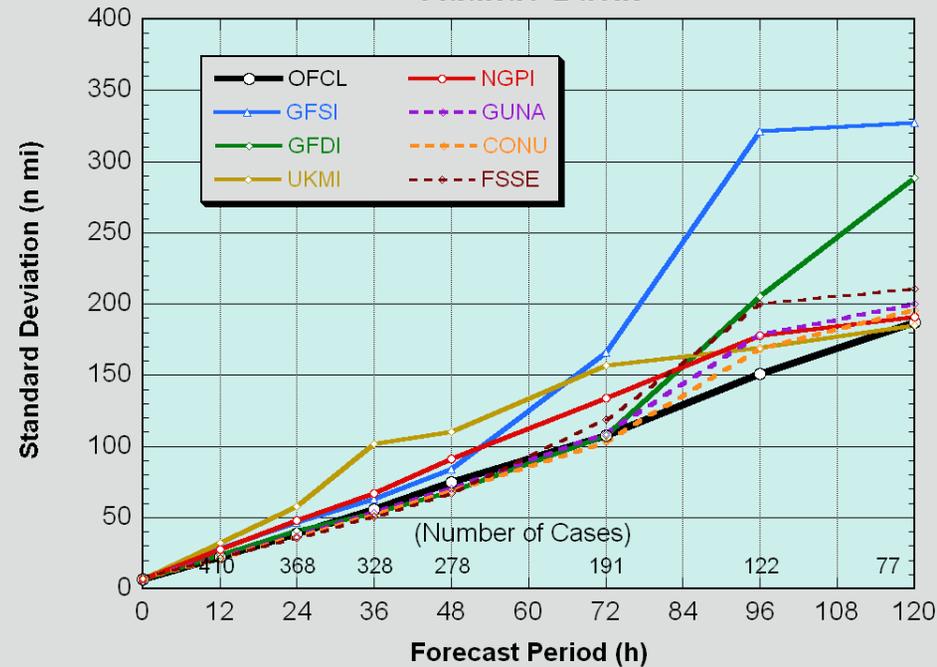


Model Variability

2005 Along-Track Standard Deviation Atlantic Basin



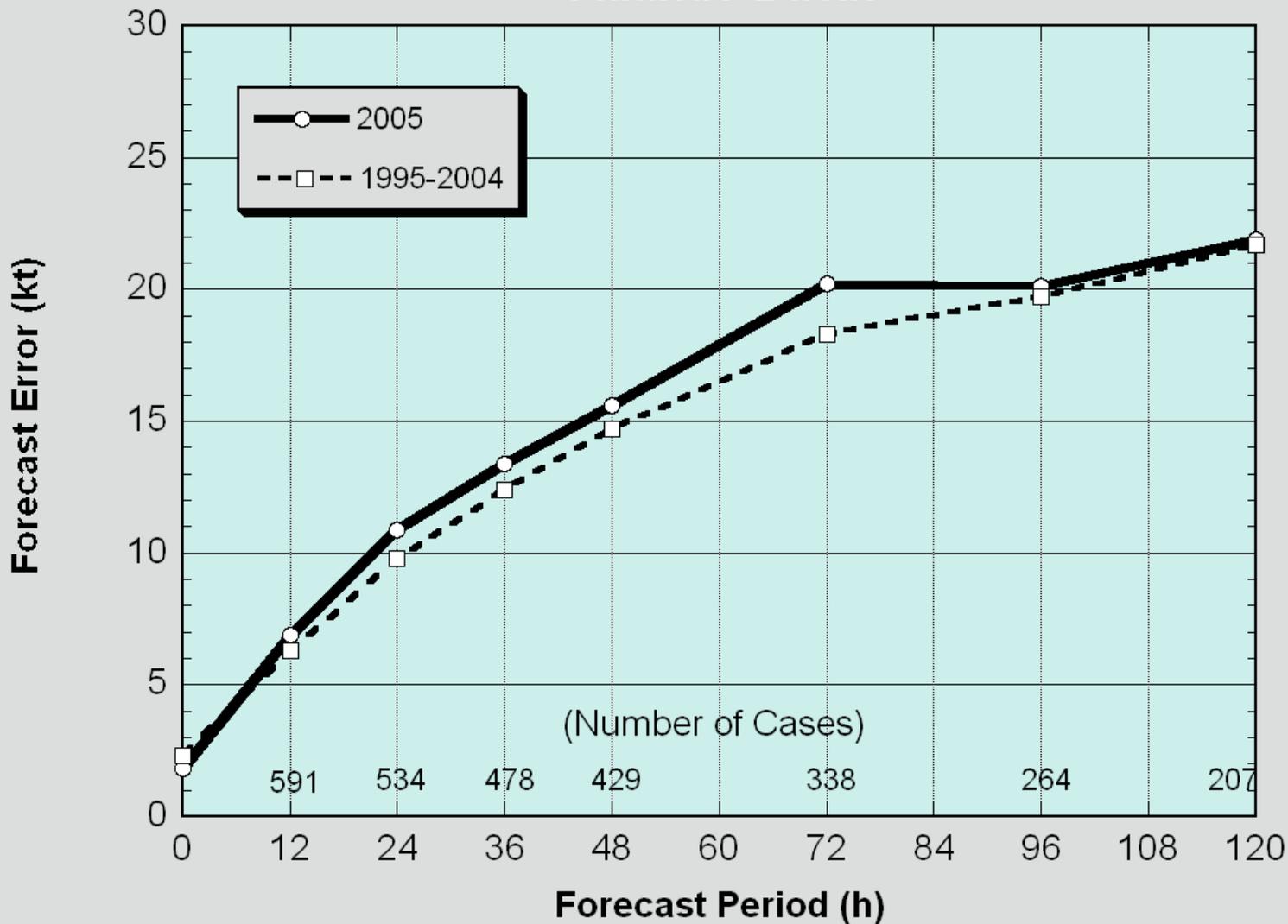
2005 Cross-Track Standard Deviation Atlantic Basin



Consensus models have less run-to-run variability than their individual components. OFCL also strives for consistency, particularly in the cross-track direction at longer lead times.

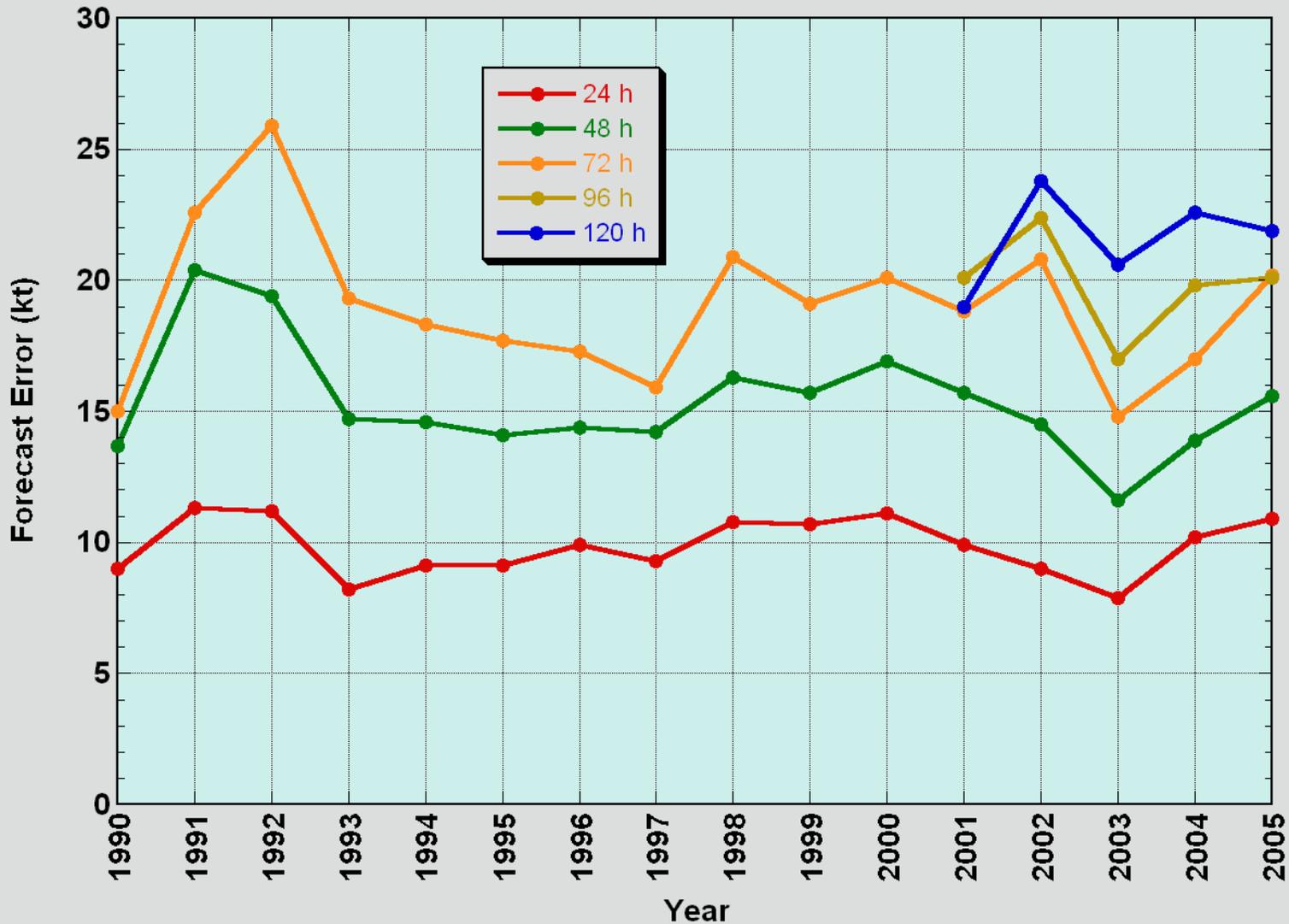
Intensity Forecasts

NHC Official Intensity Forecasts Atlantic Basin



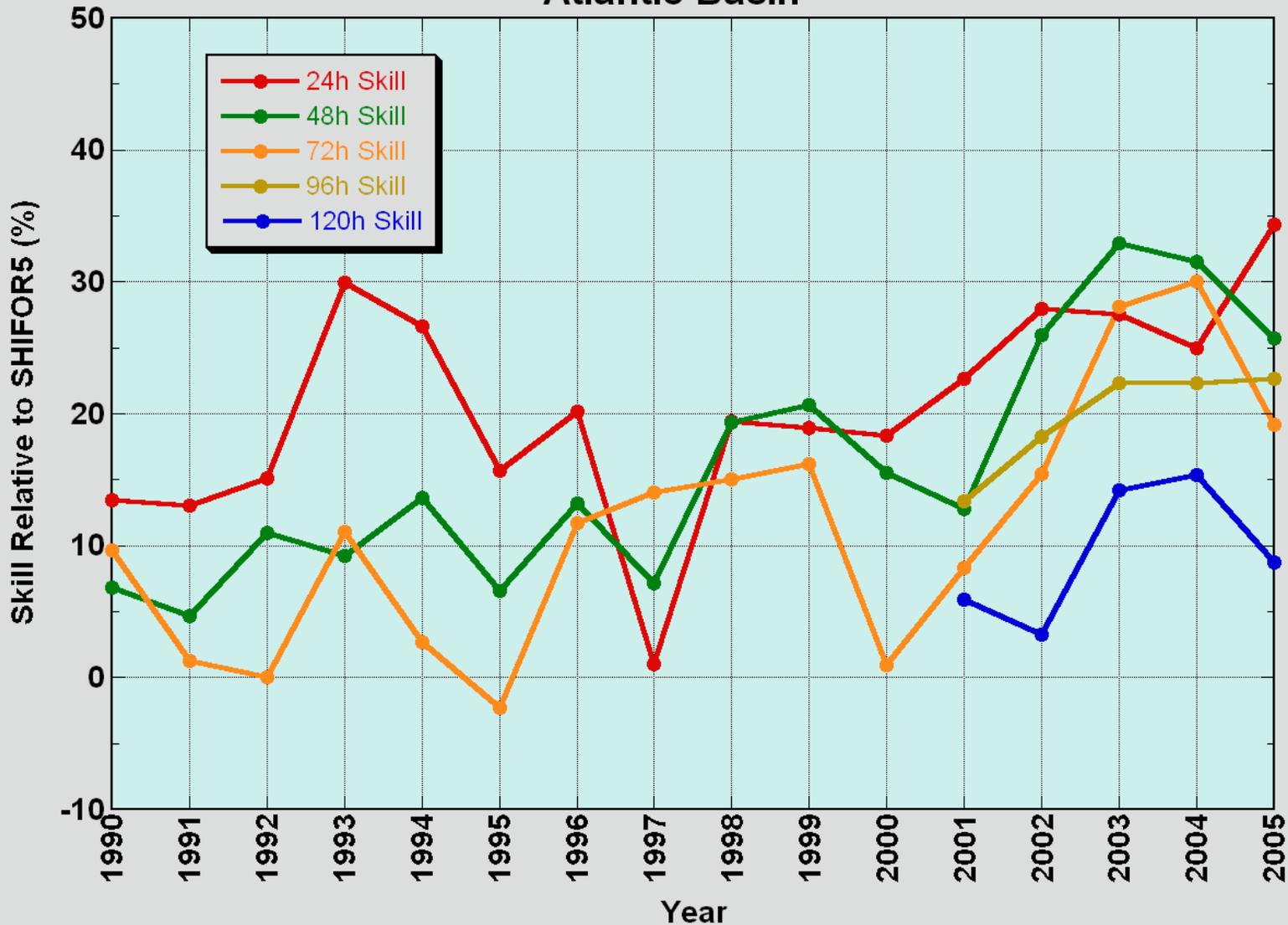
No progress with intensity?

NHC Official Intensity Error Trend
Atlantic Basin



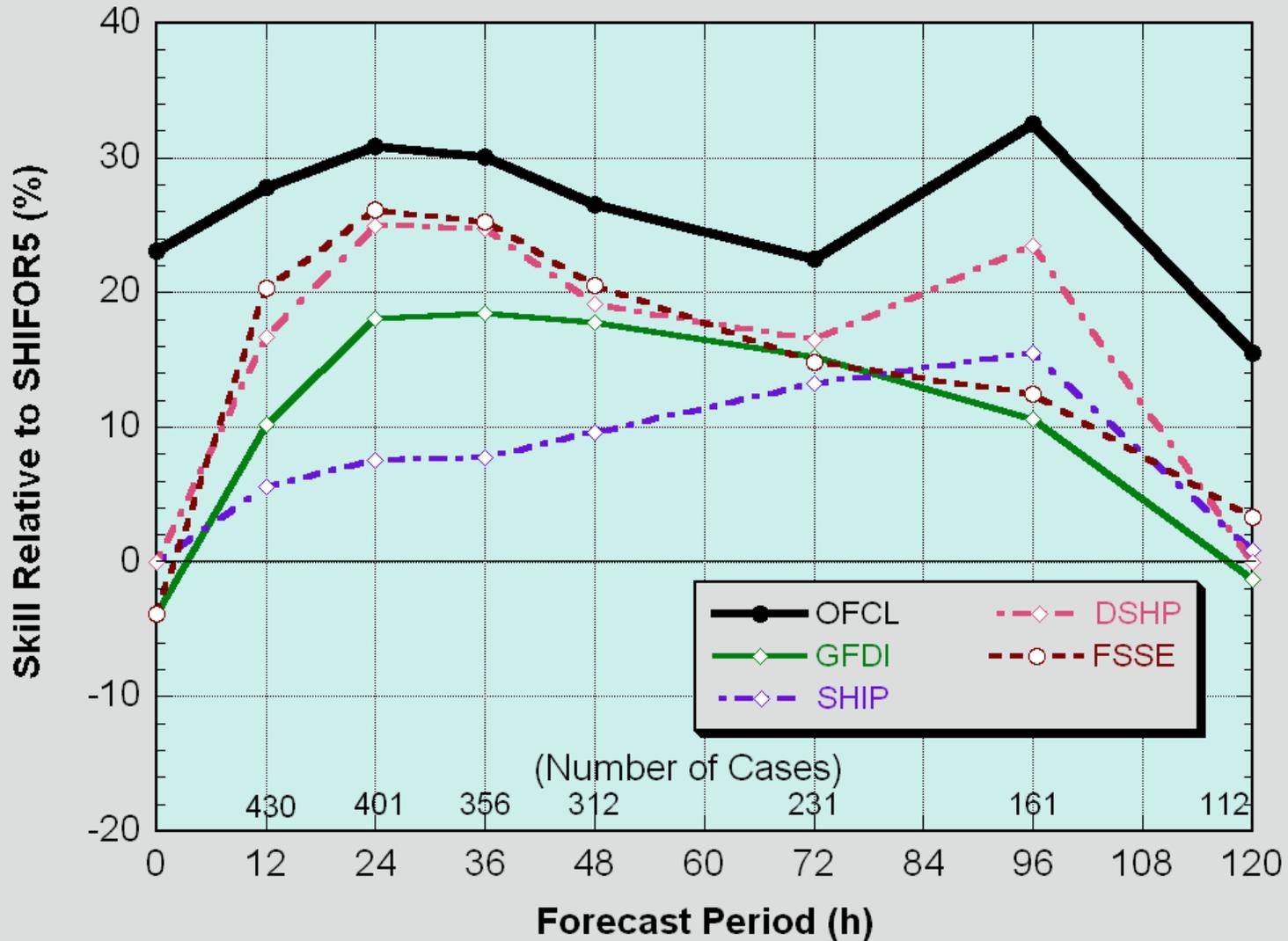
Skill shows some improvement

NHC Official Intensity Skill Trend
Atlantic Basin



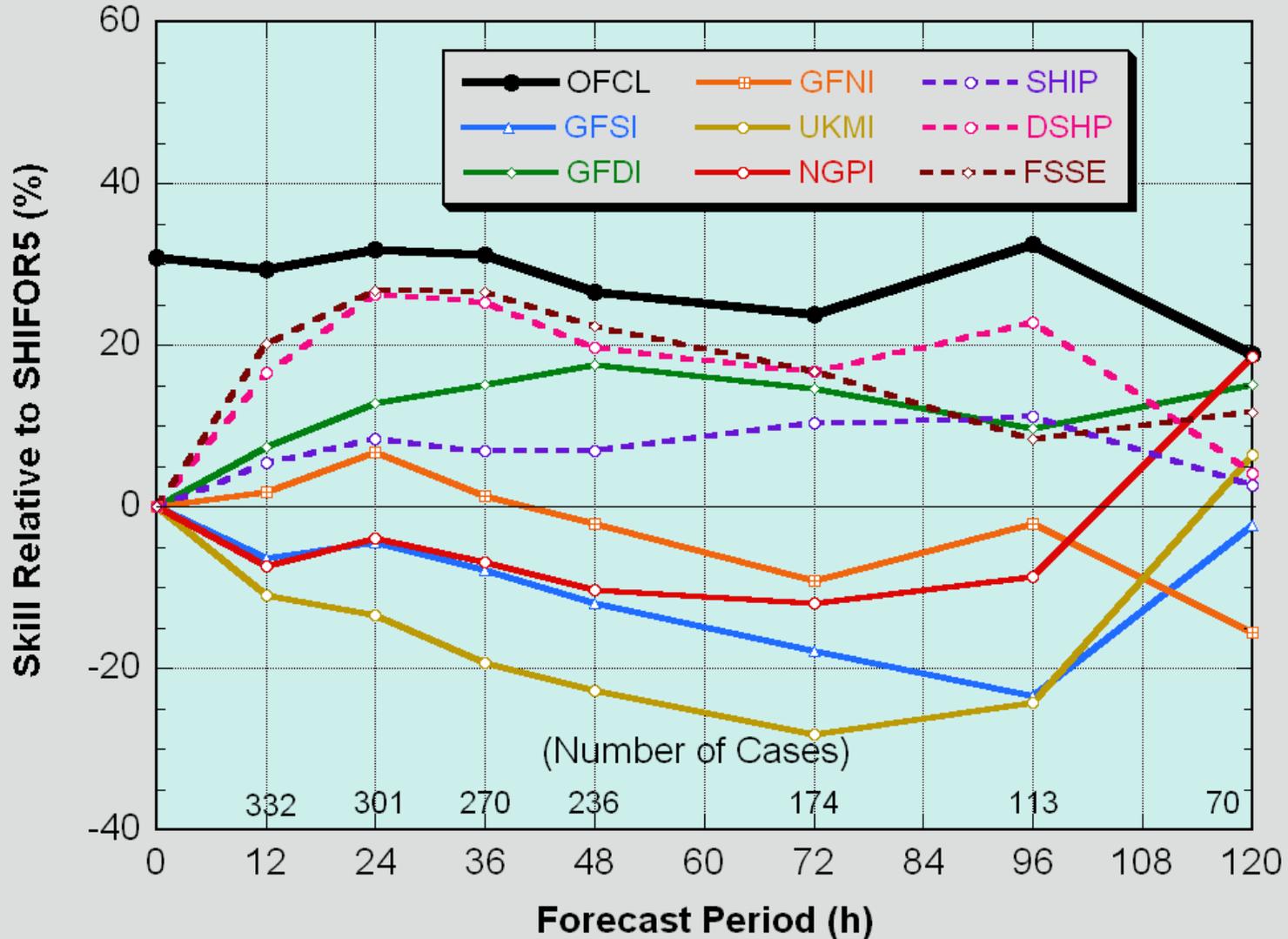
Intensity Guidance

Intensity Forecast Skill (Early Models)
2005 - Atlantic Basin



Intensity Guidance

Intensity Forecast Skill (Early Models) 2005 - Atlantic Basin

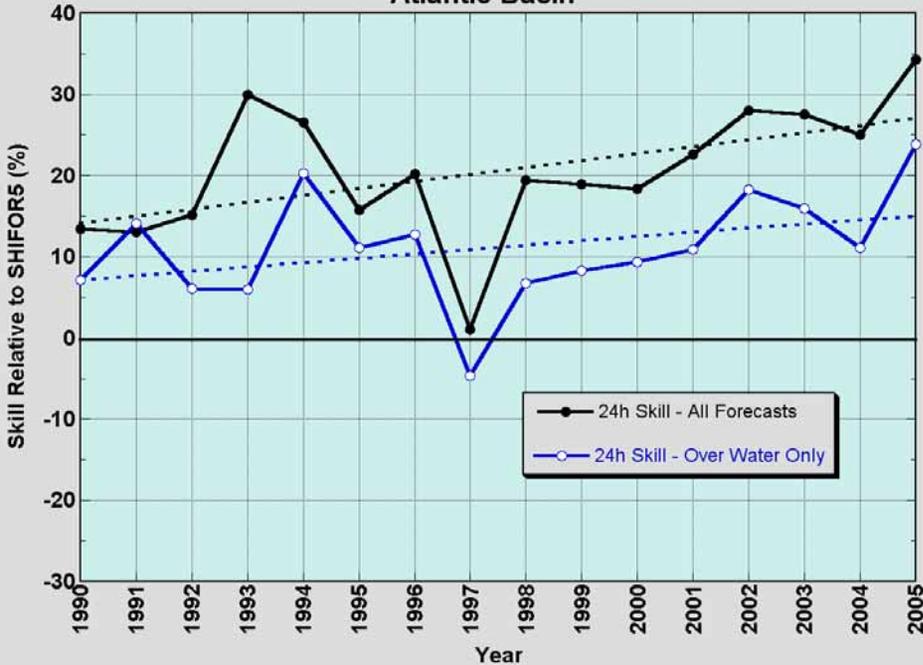


Pitfalls of SHIFOR as a Skill Baseline

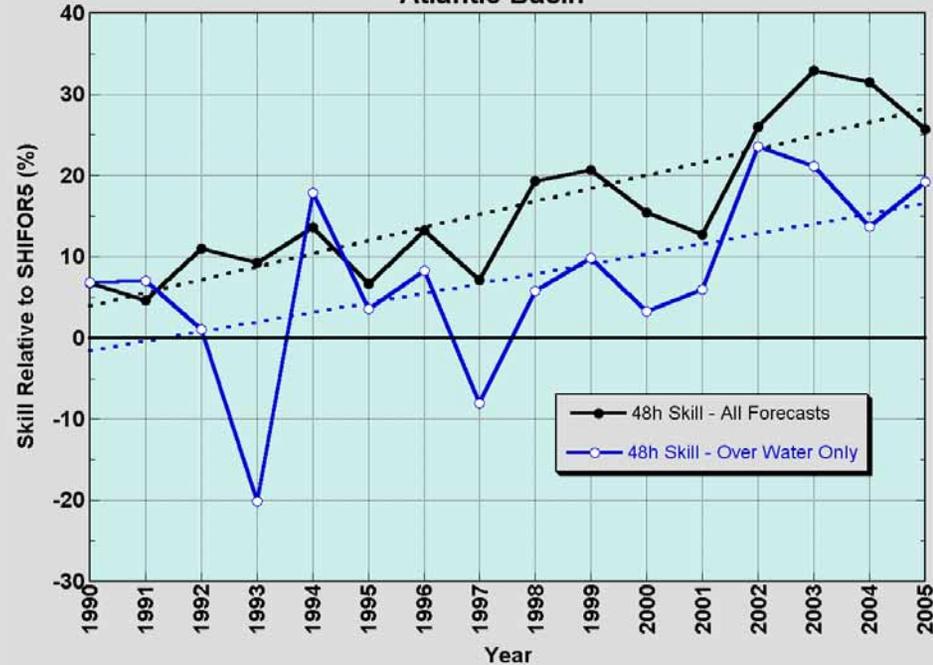
- Large errors in a climatology/persistence skill benchmark model should be indicative of an unusual or difficult forecast situation.
- Developmental dataset for SHIFOR excluded $t=0$, -6, -12 h positions within 30 n mi of land.
- Model itself has no knowledge of land. SHIFOR errors of 90 kt prior to Katrina's landfall suggest this is an unclimatological (and potentially difficult) forecast situation, when in fact it is an extremely easy forecast.
- Since land areas are (relatively) constant, what we really need is a "Decay-SHIFOR".

Intensity Skill is Lower over Water

NHC Official 24-h Intensity Skill Trend
Atlantic Basin



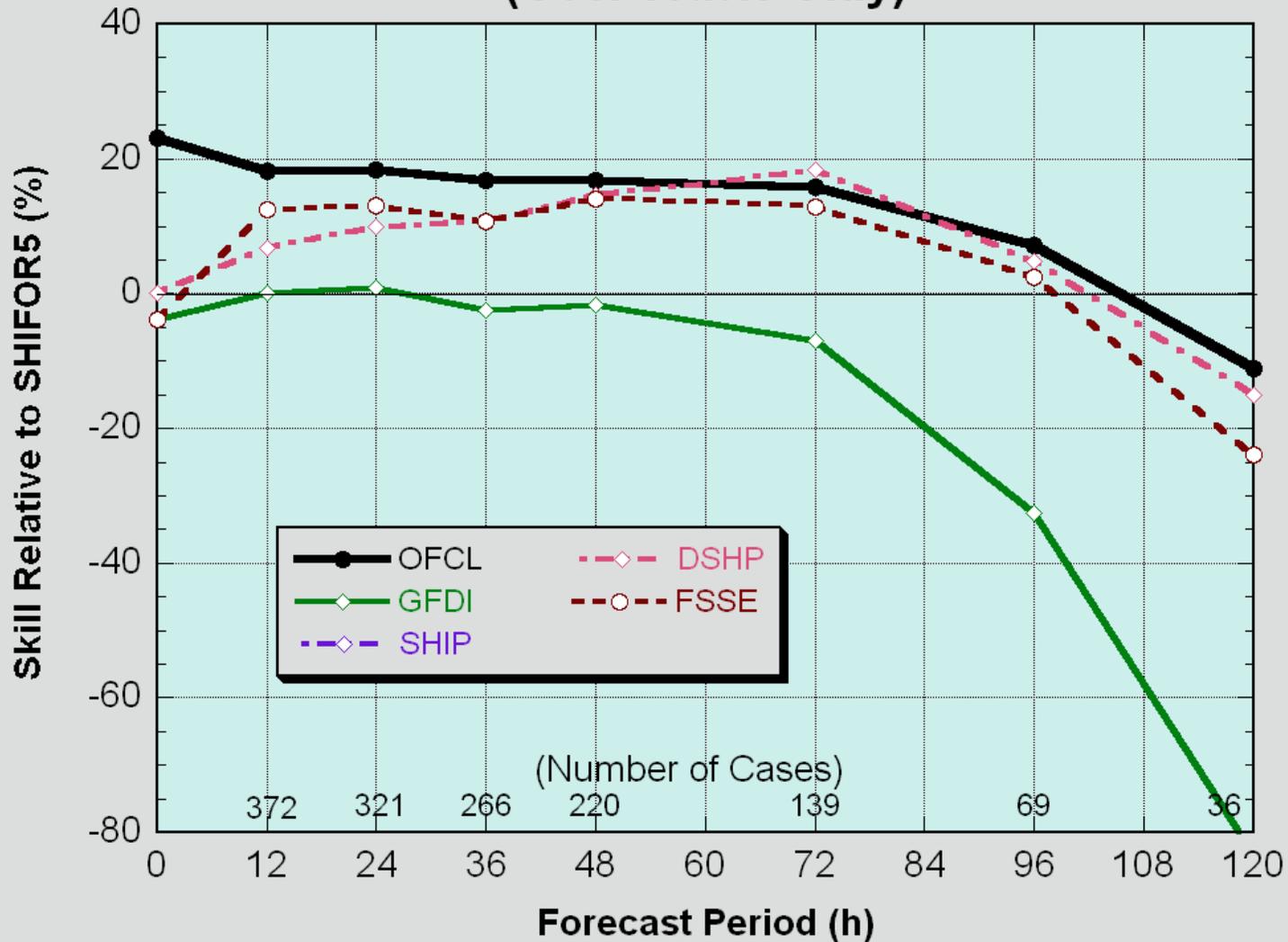
NHC Official 48-h Intensity Skill Trend
Atlantic Basin



A clearer picture of intensity forecast skill can be obtained by discarding the portions of forecasts after a landfall. For the “over water” verifications, a forecast at a particular time was discarded if either the best track or the model track had encountered land by the verification time (using DeMaria land mask). That is, only the pre-landfall portions of the best track and model tracks were retained.

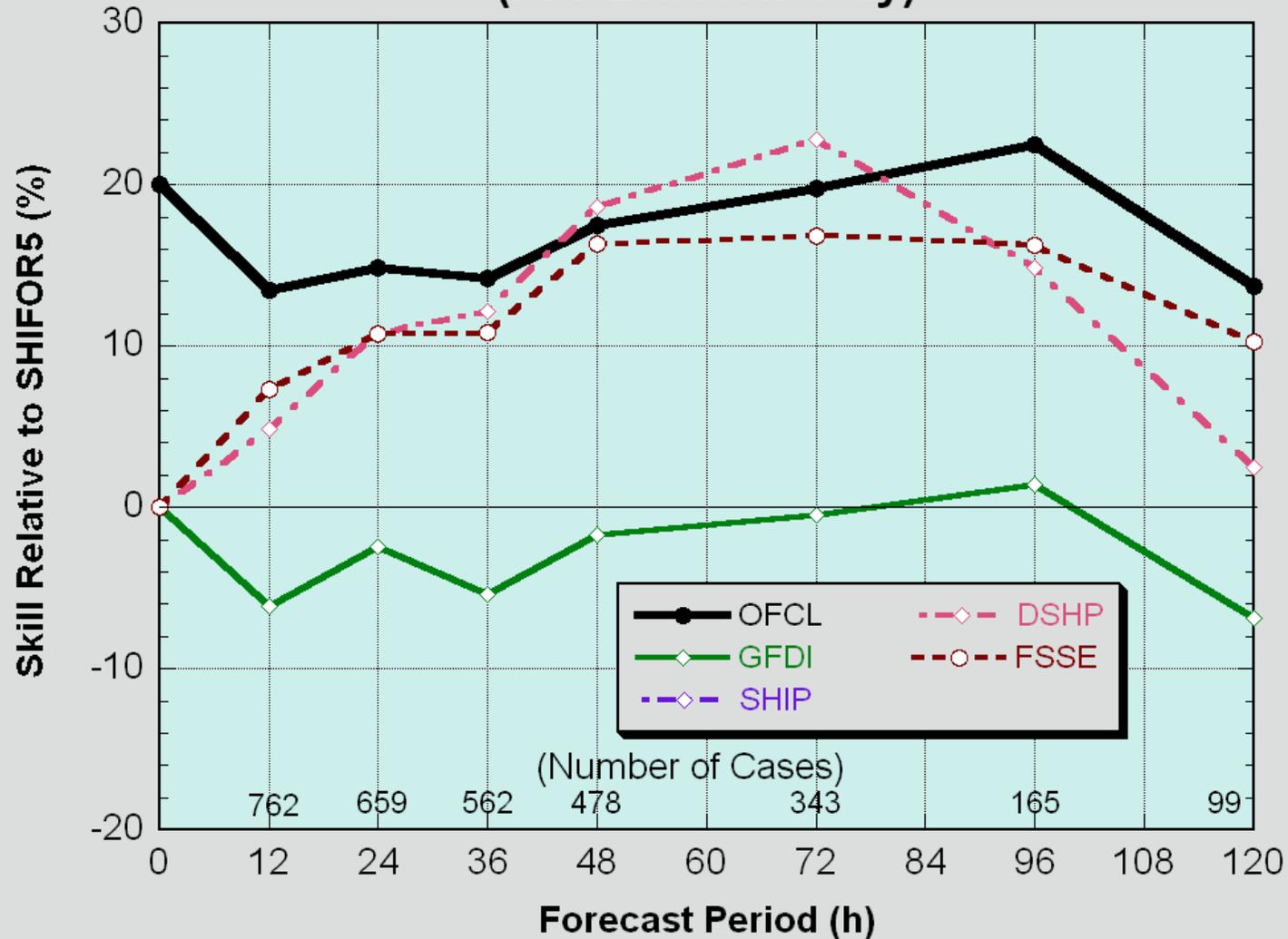
Intensity Guidance (Pre-Landfall)

Intensity Forecast Skill (Early Models)
2005 - Atlantic Basin
(Over Water Only)



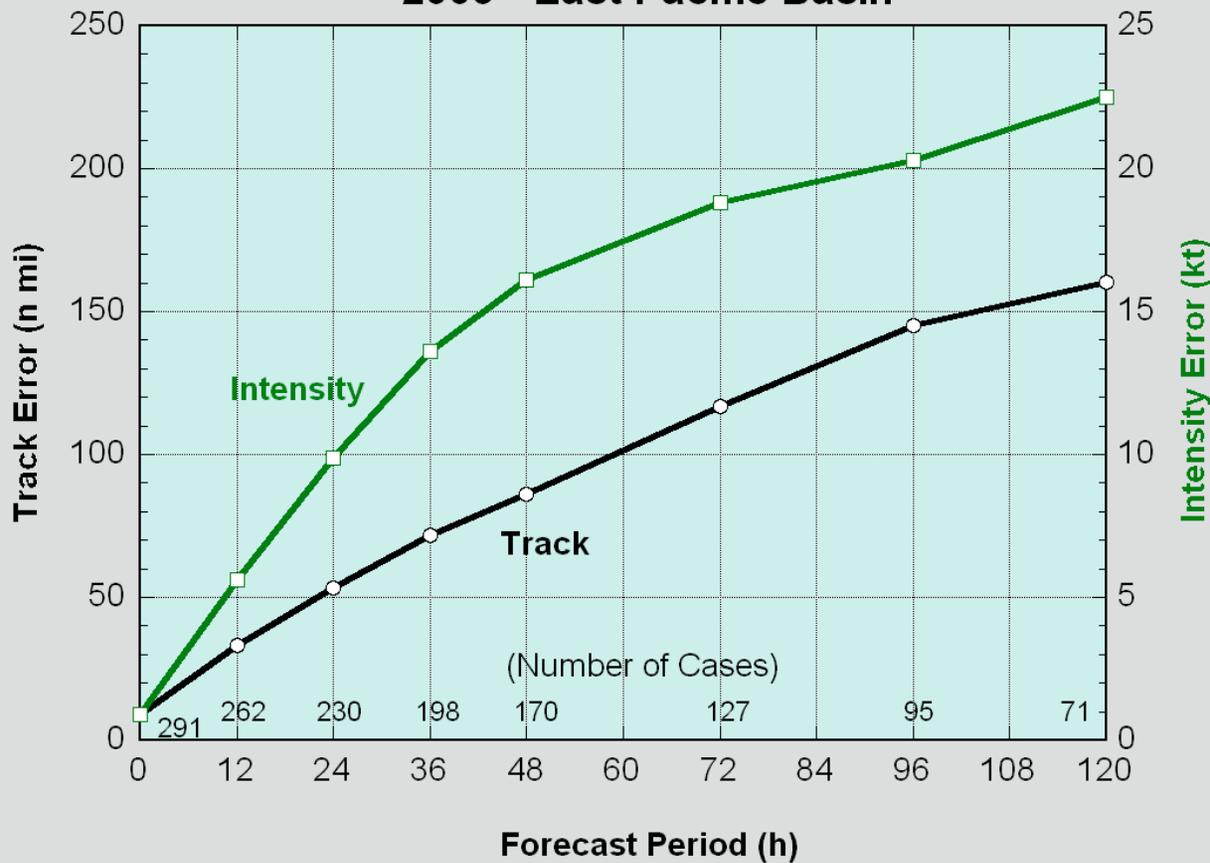
Intensity Guidance (Pre-Landfall)

Intensity Forecast Skill (Early Models)
2003-5: Atlantic Basin
(Pre-Landfall Only)



2005 Preliminary East Pacific Verification

**NHC Official Forecasts
2005 - East Pacific Basin**

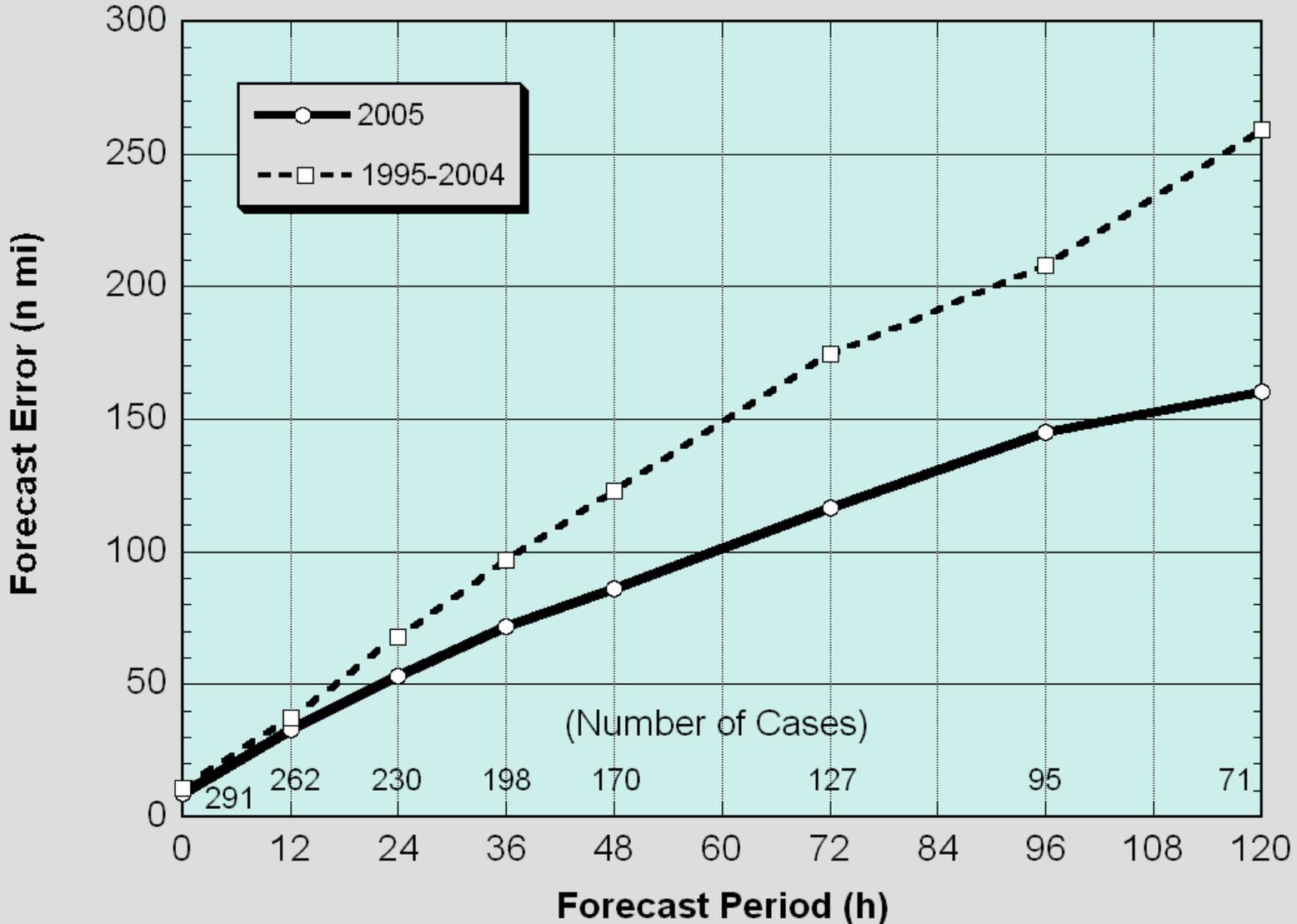


VT (h)	N	Trk (n mi)	Int (kt)
000	291	9.0	0.9
012	262	33.1	5.6
024	230	53.3	9.9
036	198	71.7	13.6
048	170	86.2	16.1
072	127	116.7	18.8
096	95	145.3	20.3
120	71	160.2	22.5

Values in green represent all-time lows.

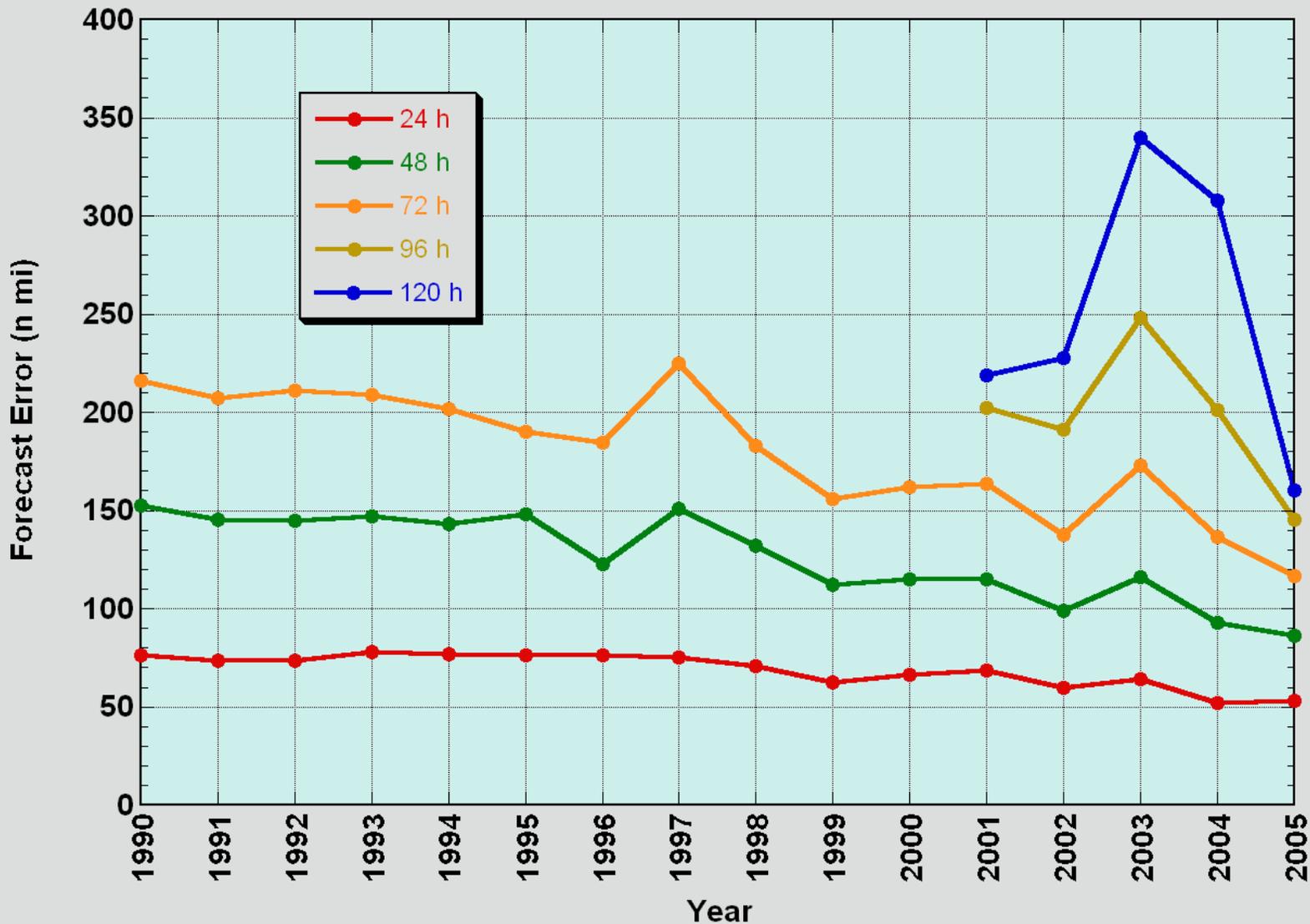
Track Comparison to Long-term Mean

NHC Official Track Forecasts East Pacific Basin



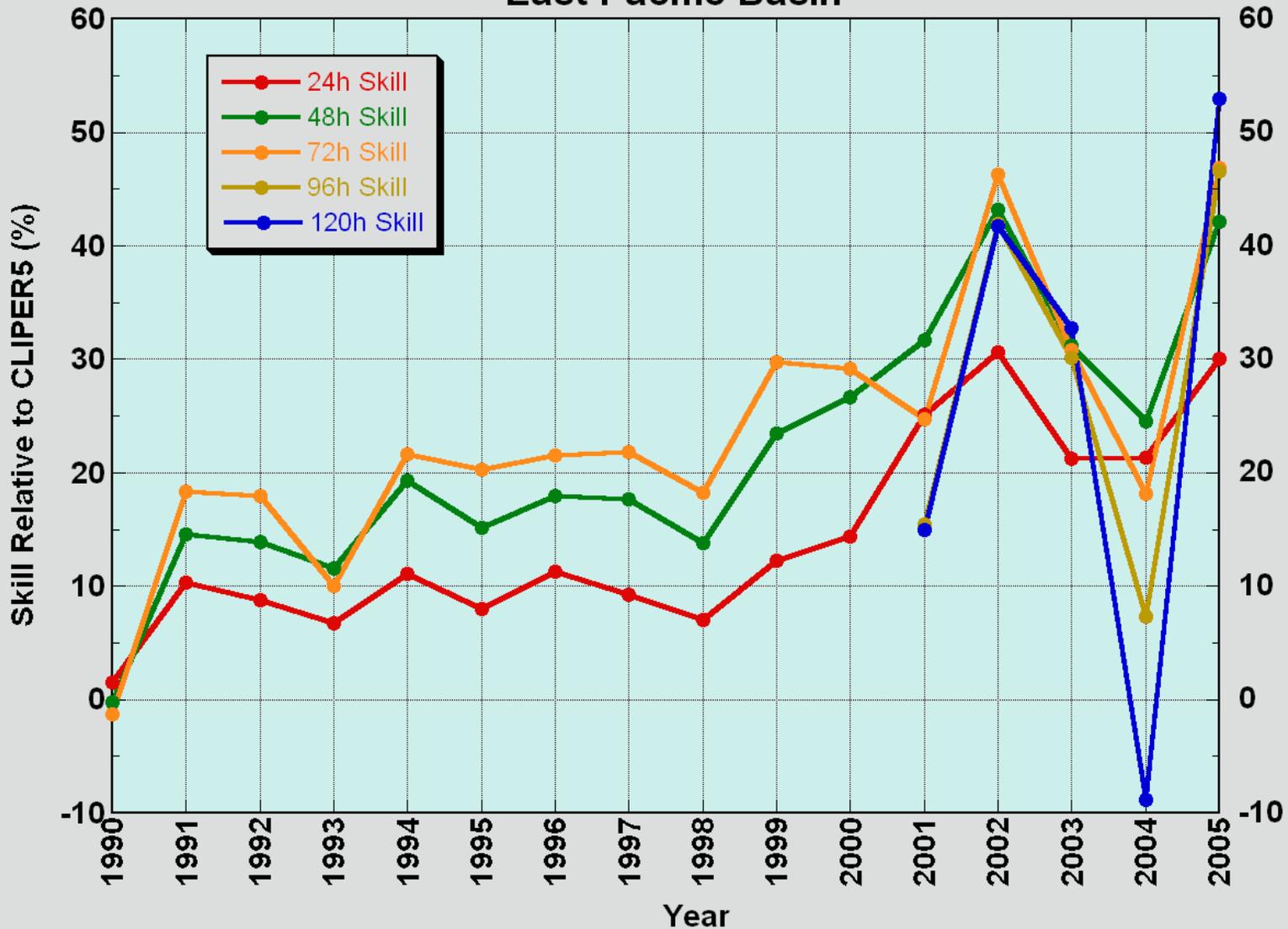
Errors cut by 1/3 in 15 years

NHC Official Track Error Trend
East Pacific Basin



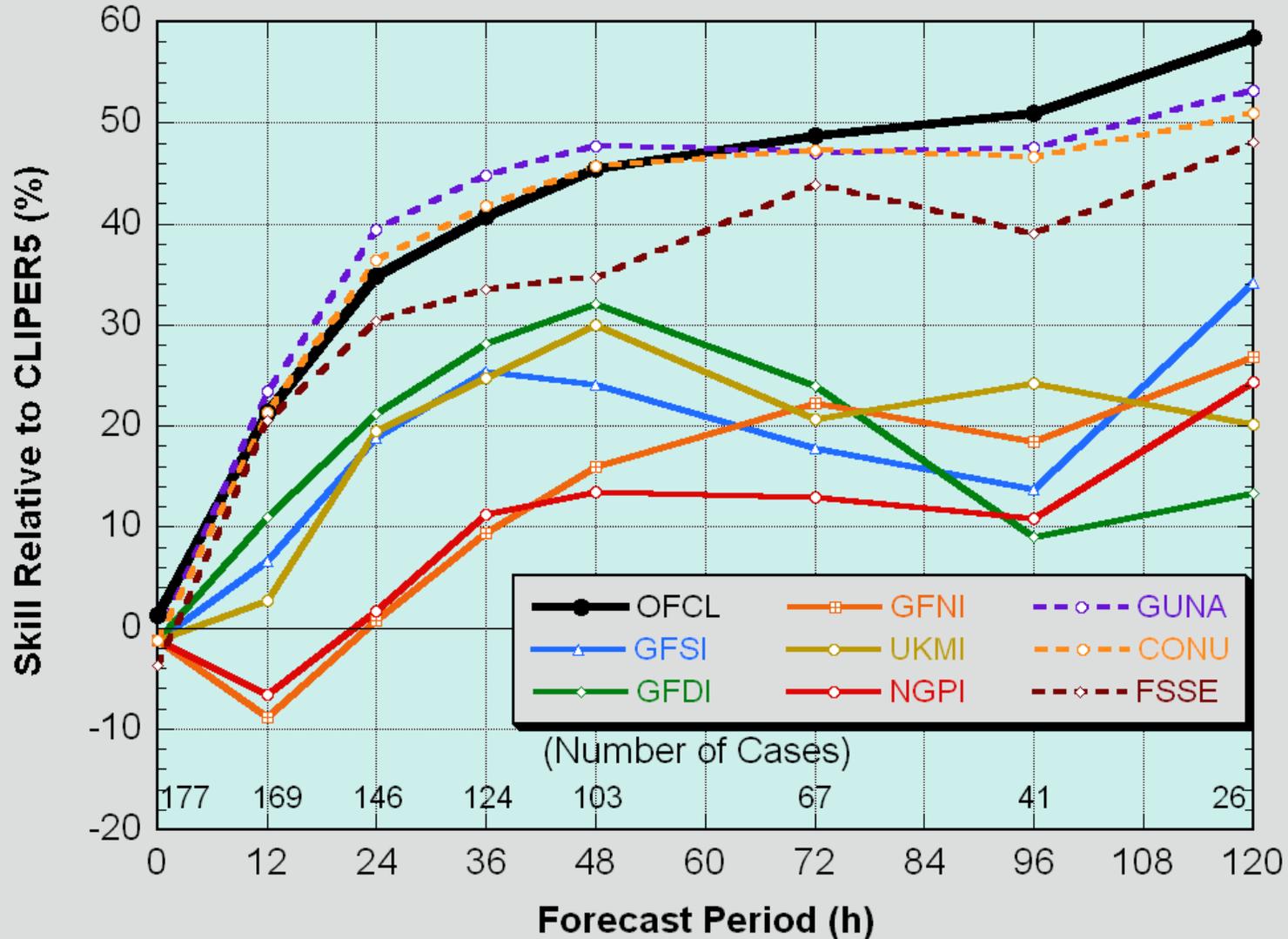
Skill levels recover from poor 2004

NHC Official Track Skill Trend
East Pacific Basin



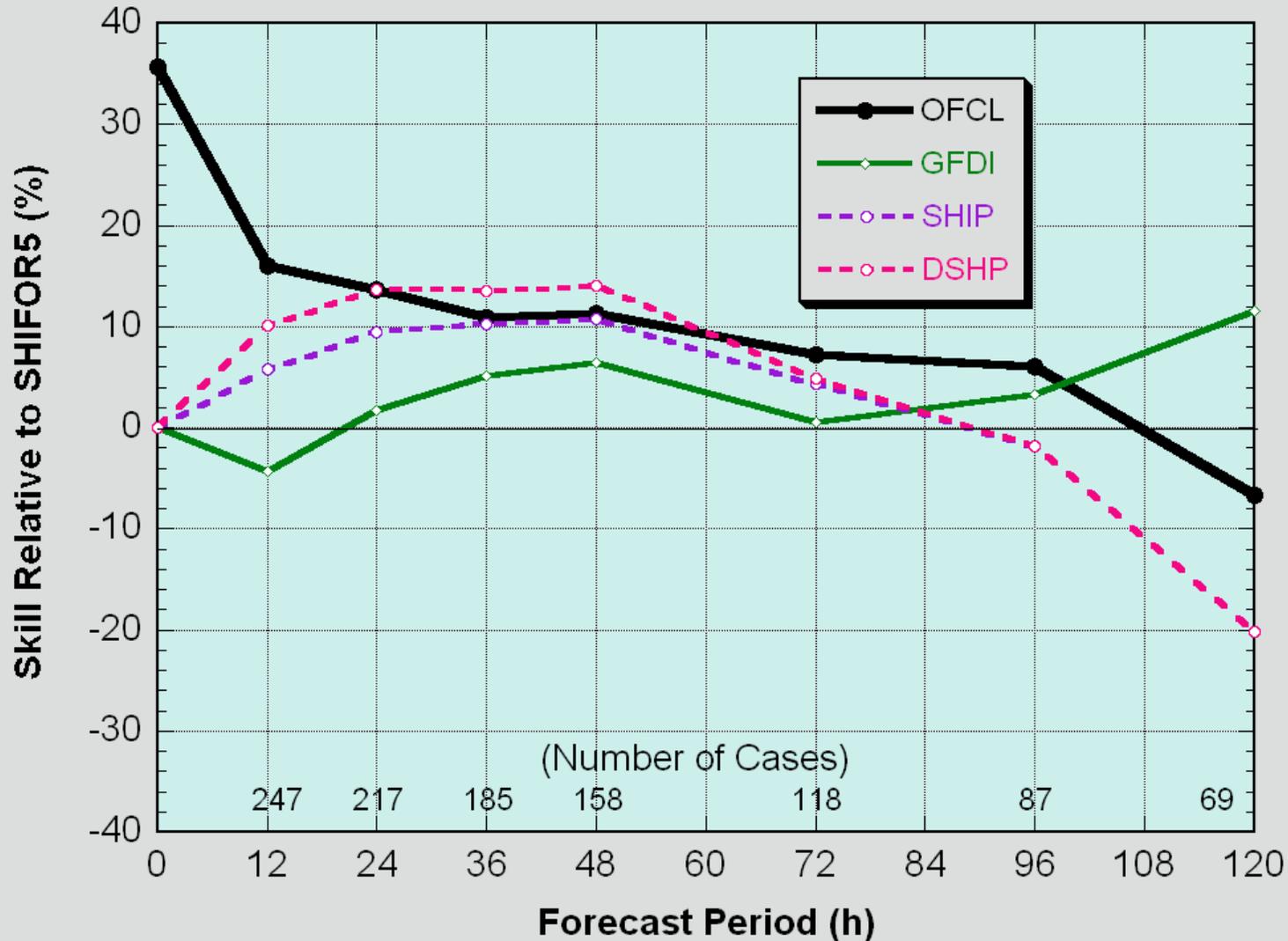
2005 Track Guidance (1st tier)

Track Forecast Skill (Early Models) 2005 - East Pacific Basin



2005 Intensity Guidance

Intensity Forecast Skill (Early Models) 2005 - East Pacific Basin



Summary

● Atlantic Basin

- OFCL track errors were up slightly over the record-setting 2004 numbers, and skill numbers were also down slightly from 2004. Overall, skill levels have changed little since 2002.
- **OFCL track forecasts were better than all the dynamical guidance models, and even beat the consensus models at some time periods.**
- GFDL and UKMET provided best dynamical track guidance. GFS performed poorly, particularly beyond 48 h. However, GFS ensemble mean was significantly better than the control at 96 and 120 h.
- Unlike in 2004, FSU super-ensemble did not beat the simple arithmetic consensus this year.

Summary (2)

● Atlantic Basin

- OFCL intensity errors continue to show little improvement, and in 2005 were slightly above the long-term means. However, OFCL forecasts were notably superior to the best objective guidance.
- Dynamical models have not yet reached the level of statistical models. Best intensity guidance was provided by the FSU super-ensemble and DSHP.
- Using SHIFOR5 as a skill baseline is misleading when there are landfalls. Forecast skill is lower for over-water forecasts.

Summary (3)

● East Pacific Basin

- OFCL track errors continued improvement trend, setting numerous records, with skill levels up substantially compared with 2004.
- OFCL beat consensus models beyond 48 h.
- No standout among the dynamical models.
Big difference between the dynamical models and the consensus.
- FSU super-ensemble did not do as well as the simple consensus.

Summary (4)

● East Pacific Basin

- OFCL intensity errors/skill show little improvement.
- SHIPS and GFDL continue to provide the only useful intensity guidance. GFDL was superior at the longer ranges.