

# Distributed Modeling Project

Presented by:

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West Gulf River Forecast Center

# History

- June 2003 – WGRFC requested to test DMS
- Oct 2003 – DMS version 1 installed
- Dec 2003 – 2 DMS basins defined
- Feb 2004 – Completed user feedback
- Feb 2004 – Begin Archiving DMS forecast timeseries
- May 2004 – 8 basins defined in forecast deck

# Getting Started

- Software installation / integration
- 2 day onsite training (Seann & Lee)
- Users manual and test procedures
  - Learning curve 1-2 days to learn system
  - Setup 2-3 basins / day once proficient
- Syntax and navigation within DMS.

# Setting up a Basin

OH Provided Data

- A-priori SAC-SMA parameter grids.
  - LZFPM, LZFSM, LZPK, LZSK, LZTWM, PFREE, REXP, UZFWM, UZK, UZTWM, ZPERC, PE, PEADJ, PXADJ
- Initial Routing parameter grids.
  - ALPHC, BETAC, DS, Q0CHN, QMCHN, ROUGC, ROUGH, SLOPC, SLOPH
- Cell connectivity file.

# Setting up a Basin

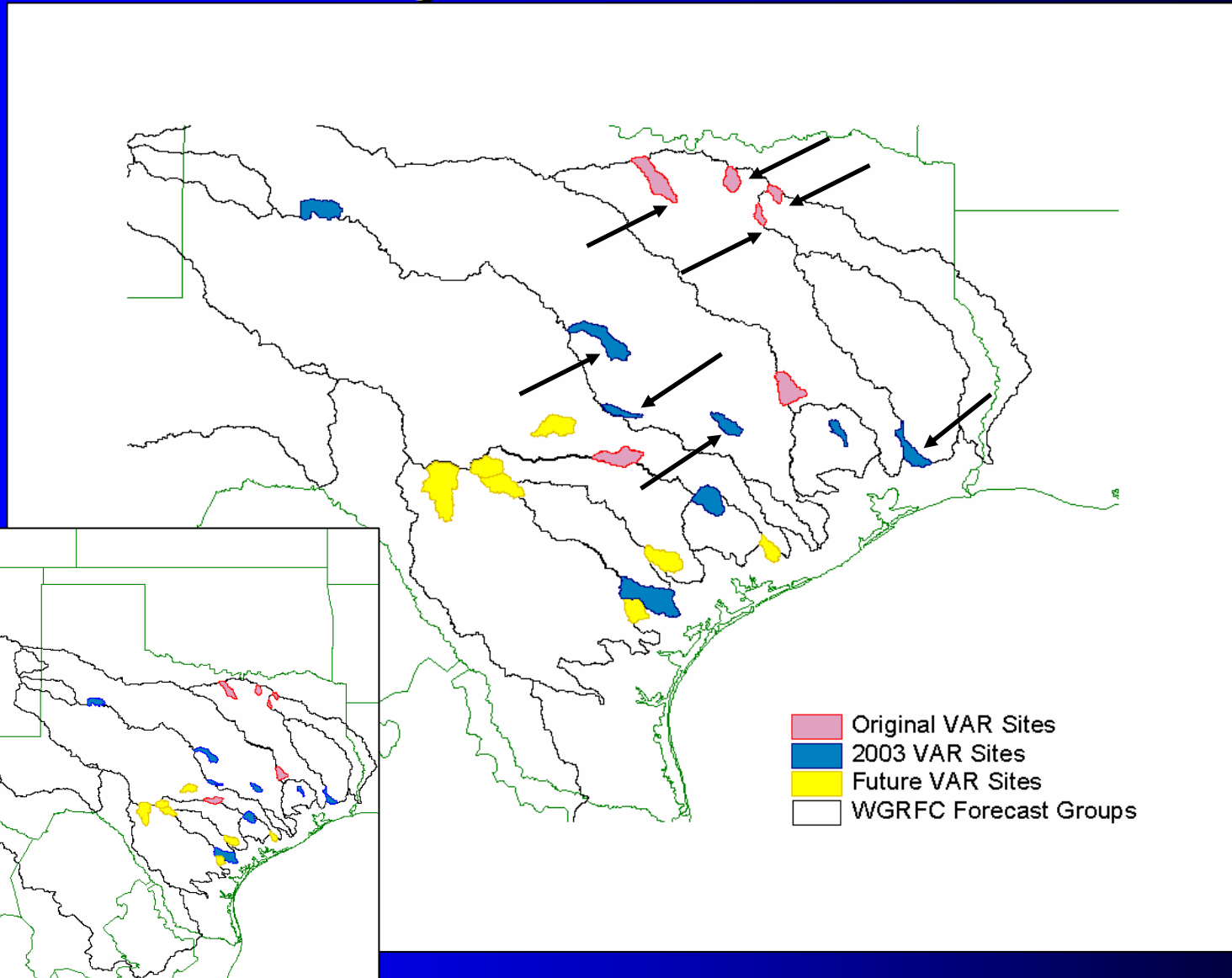
RFC Provided Data

- Basin characteristics.
  - Basin area
  - Lat & Lon HRAP ID of basin outlet
- USGS flow measurement data.
- Historical xmrg and hourly flow data.

# DMS Simulations

- 8 basins setup with varying degrees of calibration.
- Timeseries archived at OH for verification.
- Visual inspection promising
- Spring rainfall activity provided several small events for evaluation.

# Project Locations



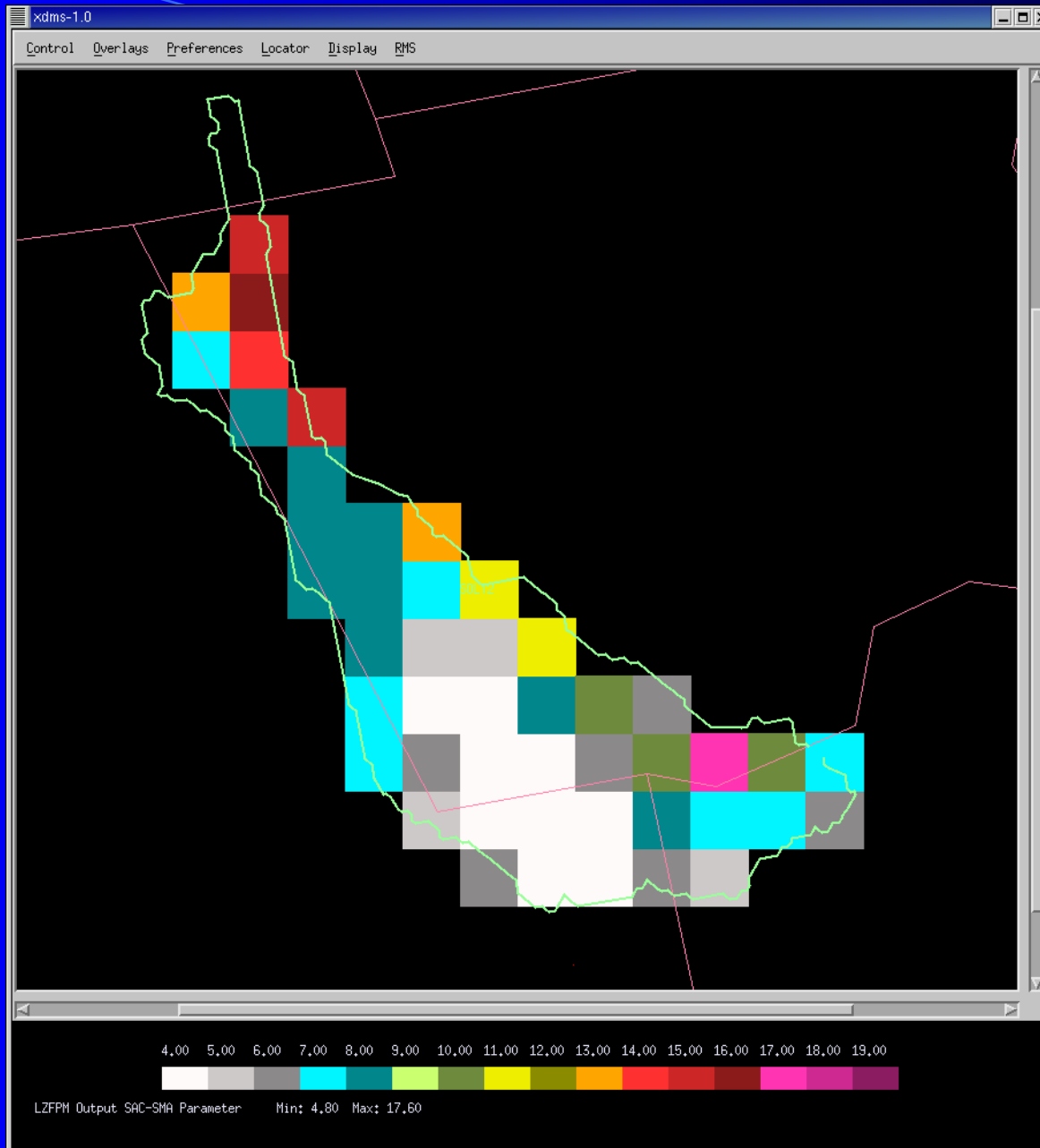
# Basin Characteristics

Basin	Drainage Area (mi <sup>2</sup> )	Avg Hillslope (mm/m)	Time to Peak (hrs)
SOLT2	336	.0013	82
FRBT2	373	.0174	9
KNLT2	349	.0274	7
GNVT2	82	.0058	16
QLAT2	76	.0065	10
ATIT2	326	.0168	9
DCJT2	401	.0134	6
MCKT2	165	.0107	13



# Model Calibration

- Approach similar to lumped calibration.
- Adjustment limited to percent change from a priori estimates.
- Lumped values only – PCATIM, ADIMP, RIVA
- Key assumption – The relative differences between grids is an adequate representation.
- Outlying grid value(s) may possibly drive calibration.



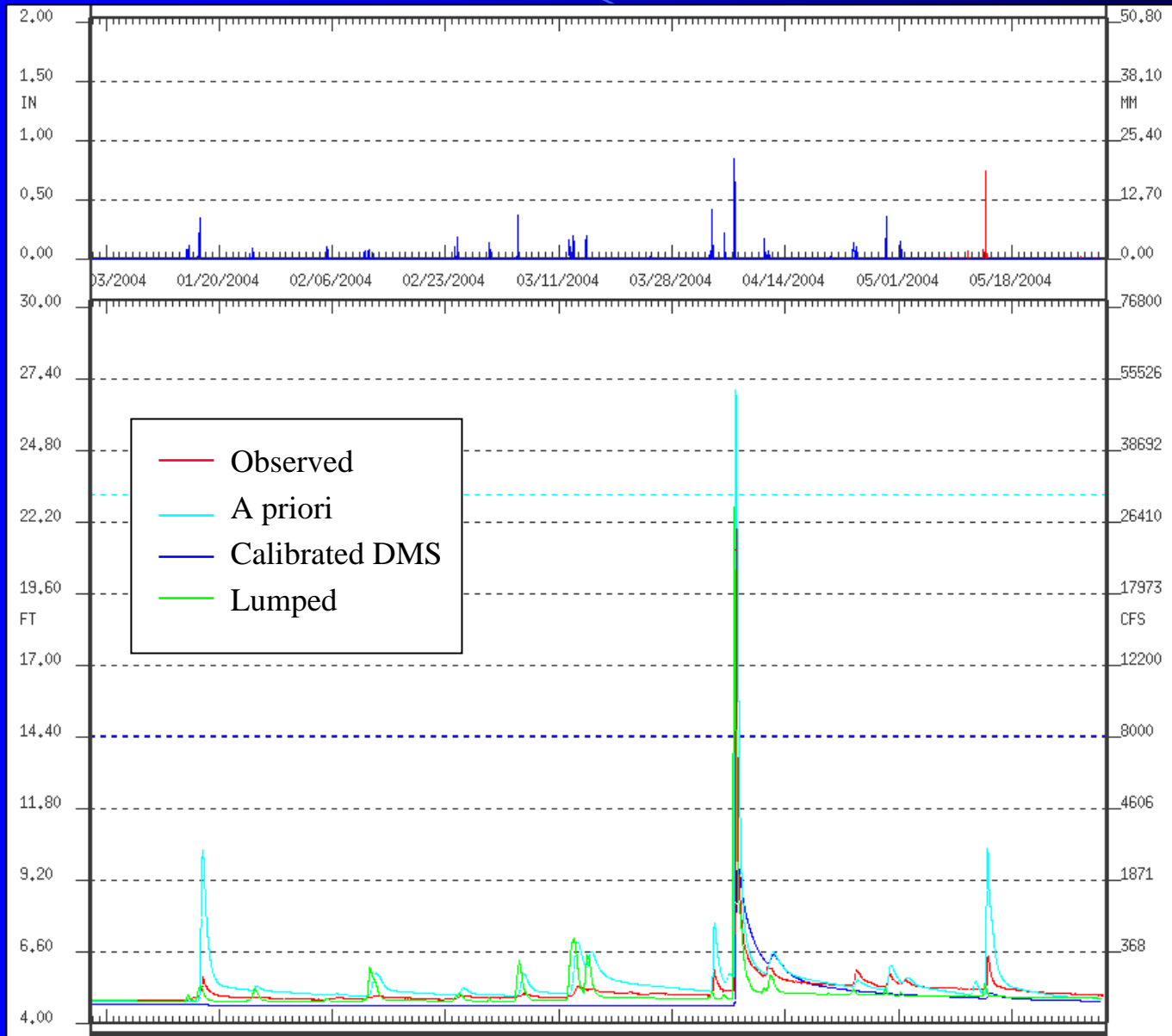
# Current Calibration

BASIN	UZTWM	UFWWM	UZK	PCTIM	ADIMP	RIVA	ZPERC	REXP	LZTWM	LZFSM	LZFPM	LZSK	LZPK	PFREE
ATIT2	-1.94	-1.57	-1.27	0.00	0.00	0.00	-0.28	-0.66	-3.30	-1.06	-0.67	-0.89	-5.71	-1.33
DCJT2	-2.00	-1.10	-1.00	0.00	0.20	0.00	-2.50	-1.19	-2.00	-0.74	-0.45	-1.28	-1.52	-0.34
FRBT2	-10.00	-5.00	-1.00	0.00	0.00	0.00	-2.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
GNVT2	-3.00	-0.69	-2.00	0.00	0.00	0.00	-1.82	-1.20	-0.91	-0.20	-0.36	-1.11	-1.72	-0.11
KNLT2	-2.50	-1.00	-1.00	0.00	0.00	0.01	-1.40	-0.70	-2.50	-0.30	-0.30	-1.00	-1.00	-1.00
MCKT2	-1.20	-2.10	-2.00	0.00	0.40	0.00	-2.40	-1.00	-0.70	-1.20	-1.90	-5.70	-4.00	-0.10
QLAT2	-1.00	-0.50	-1.00	0.00	0.00	0.00	-1.00	-1.00	-0.50	-0.50	-0.30	-0.50	-0.50	-0.25
SOLT2	-1.00	-1.00	-1.50	0.00	0.00	0.00	-1.00	-0.40	-1.00	-1.00	-0.30	-1.00	-5.00	-1.00

# FRBT2

FRBT2	time period	%Bias	Abs.% Bias	RMS (CMS)	R
A priori	4/1/98-12/31/03	290.93	301.29	37.65	0.76
Calib	4/1/98-12/31/03	13.49	97.78	16.26	0.66
Storm	1/1/04-5/31/04	-51.99	76.08	25.72	0.38
Lumped	1/1/04 – 2/31/04	24.89	107.95	33.97	0.35

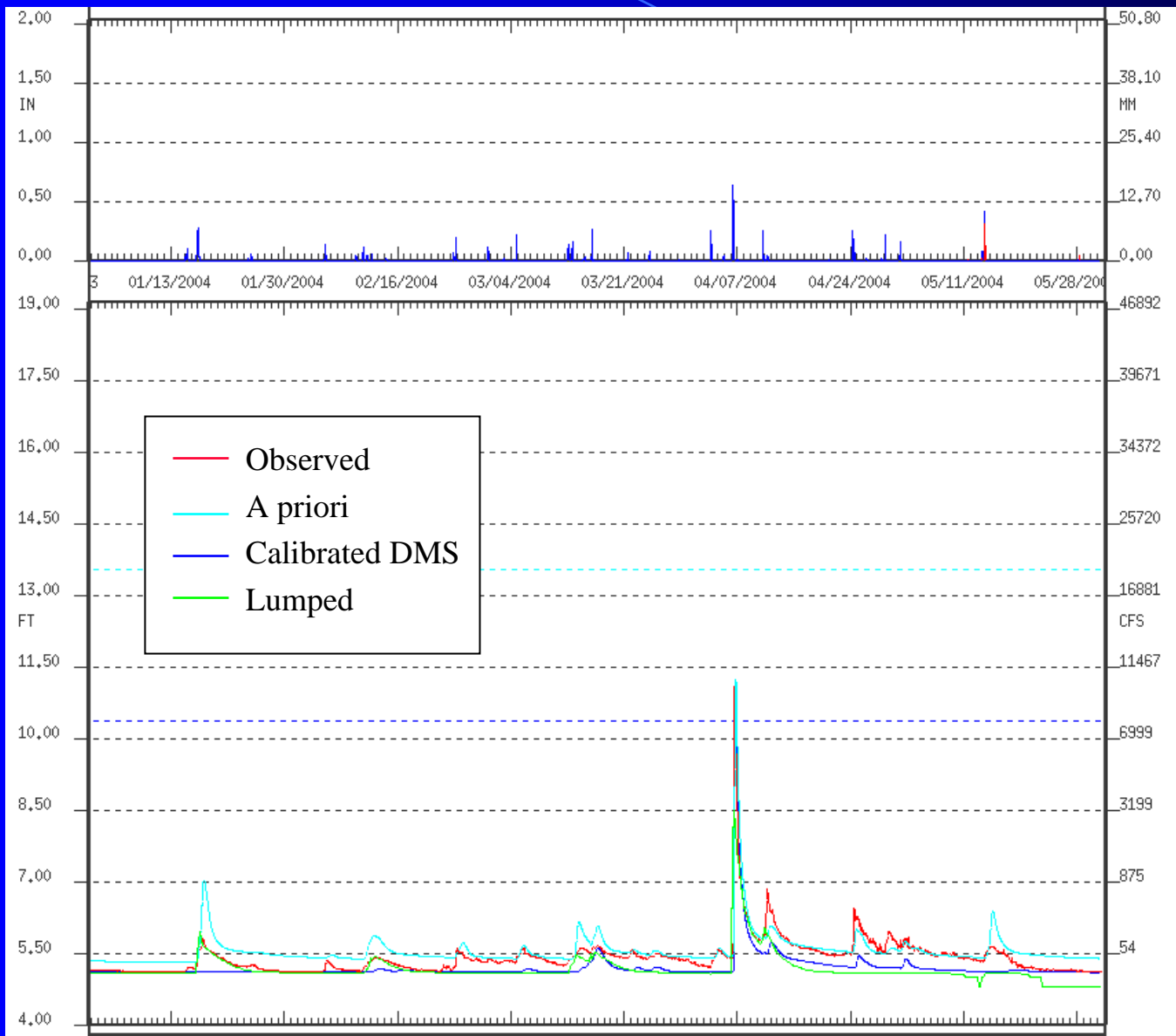
# FRBT2



# KNLT2

KNLT2	time period	%Bias	Abs.% Bias	RMS (CMS)	R
A priori	10/1/97-12/31/03	140.54	164.54	15.08	0.77
Calib	10/1/97-12/31/03	7.98	87.38	13.58	0.70
Storm	1/1/04-5/31/04	-43.54	52.42	3.51	0.96
Lumped	1/1/04 – 2/31/04	-53.97	70.84	6.86	0.75

# KNLT2

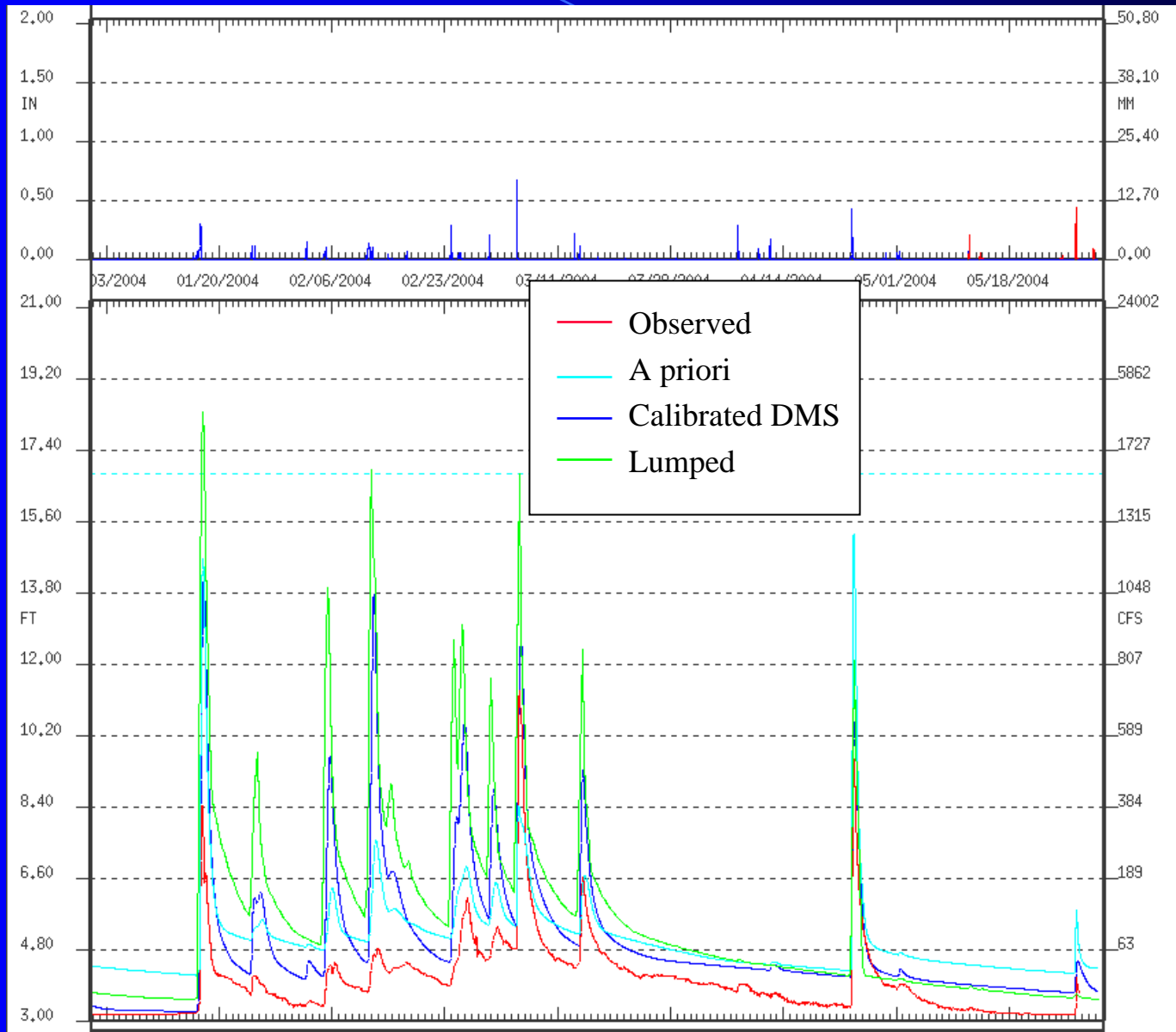


# MCKT2

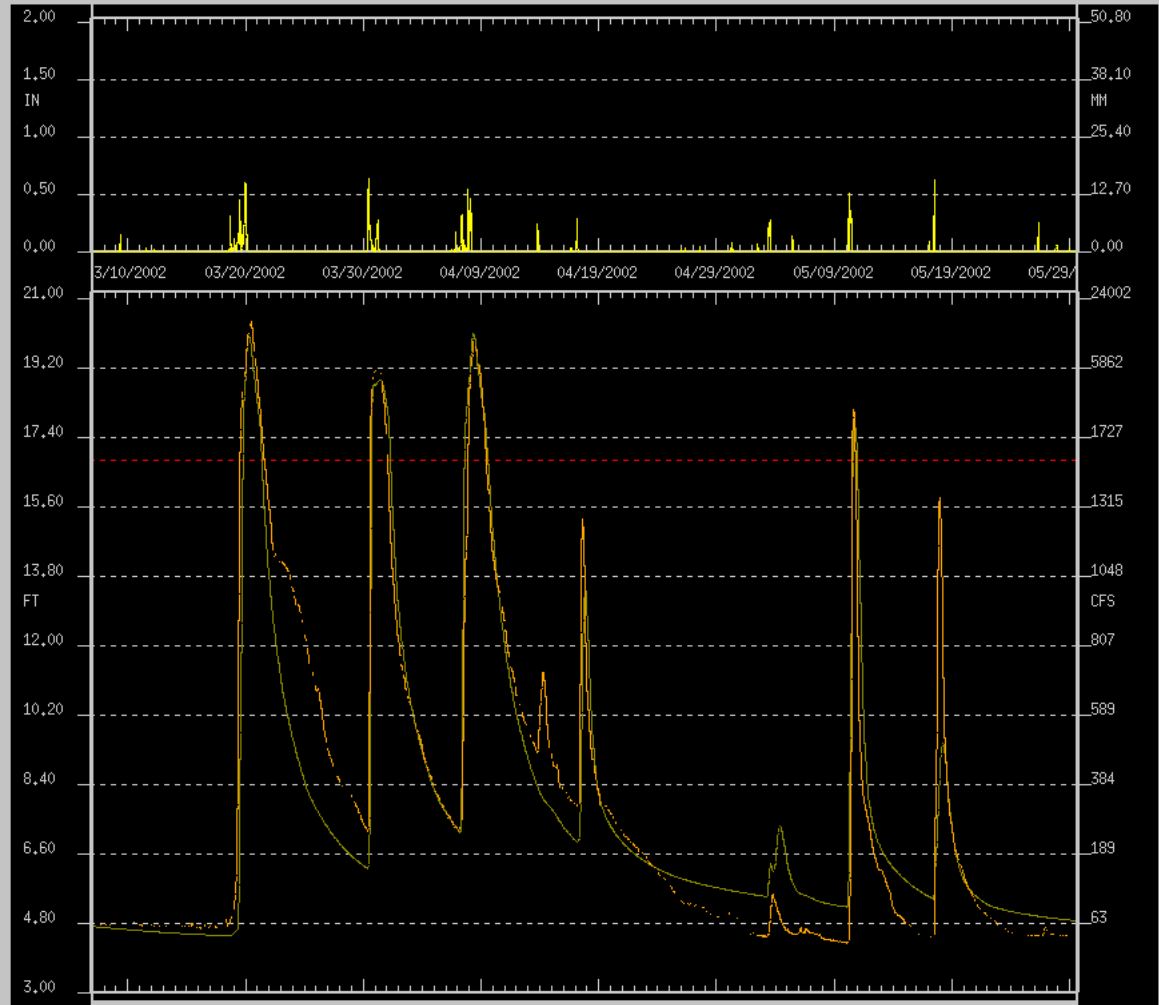
MCKT2	time period	%Bias	Abs.% Bias	RMS (CMS)	R
A priori	7/1/97-12/31/03	-0.52	90.33	12.34	0.63
Calib	7/1/97-12/31/03	-16.49	62.75	8.34	0.81
Storm	1/1/04-5/31/04	182.23	182.93	3.49	0.74
Lumped	1/1/04 – 2/31/04	368.03	371.25	6.97	0.65



# MCKT2



ID: MCKT2



Days Displayed in Window  
85

Hydro Time Series

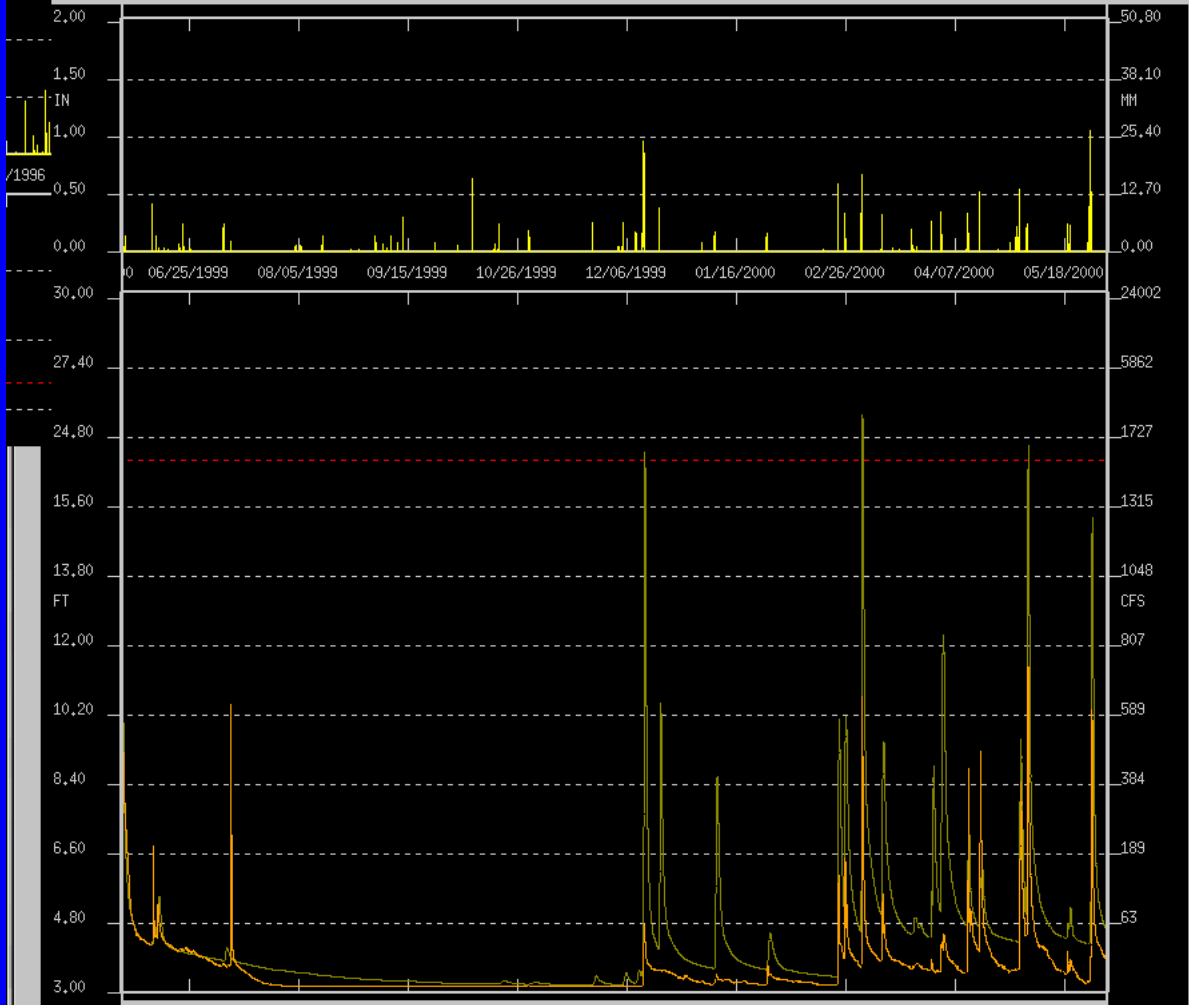
- Obs
- MCKT2,hyd
- MCKT2
- QINE
- MCKT2.obs,hyd

Add Time Series

Close



ID: MCKT2



Days Displayed in Window  
375

Hydro Time Series

- Obs
- MCKT2,hyd
- MCKT2
- QINE
- MCKT2,obs,hyd

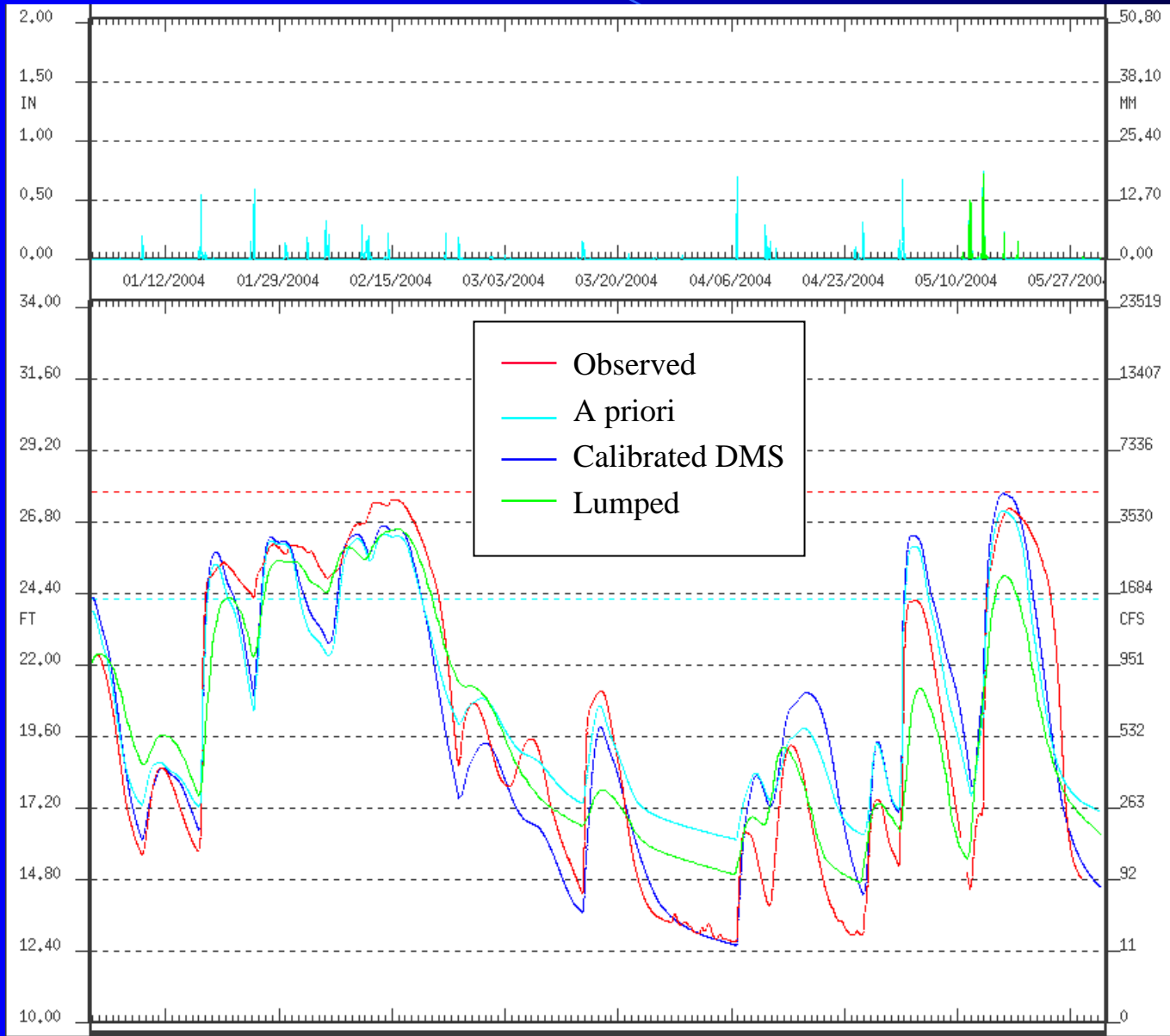
Add Time Series

Close

# SOLT2

SOLT2	time period	%Bias	Abs.% Bias	RMS (CMS)	R
A priori	1/1/96-12/31/03	29.87	76.95	19.55	0.86
Calib	1/1/96-12/31/03	38.55	81.99	24.21	0.84
Storm	1/1/04-5/31/04	-7.88	33.60	14.64	0.90
Lumped	1/1/04 – 2/31/04	-23.04	35.26	16.85	0.93

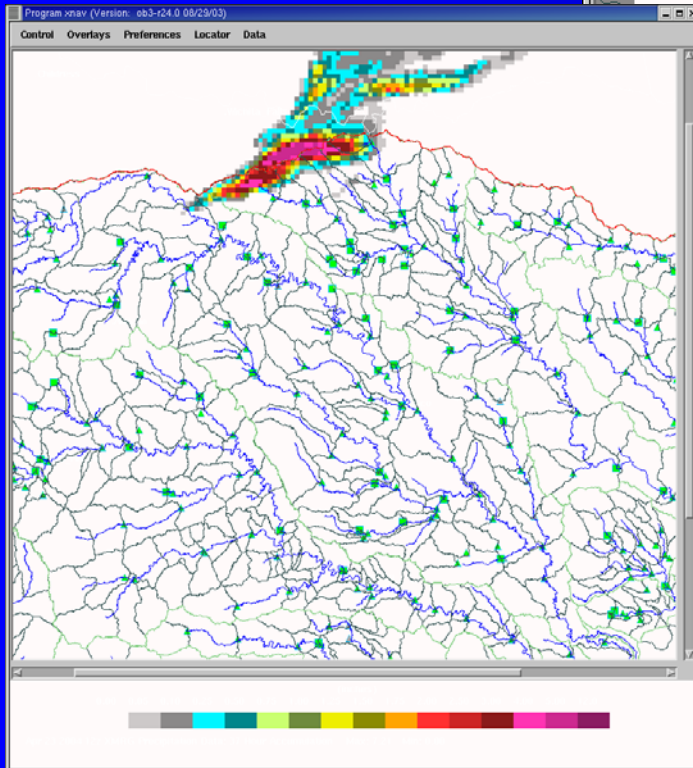
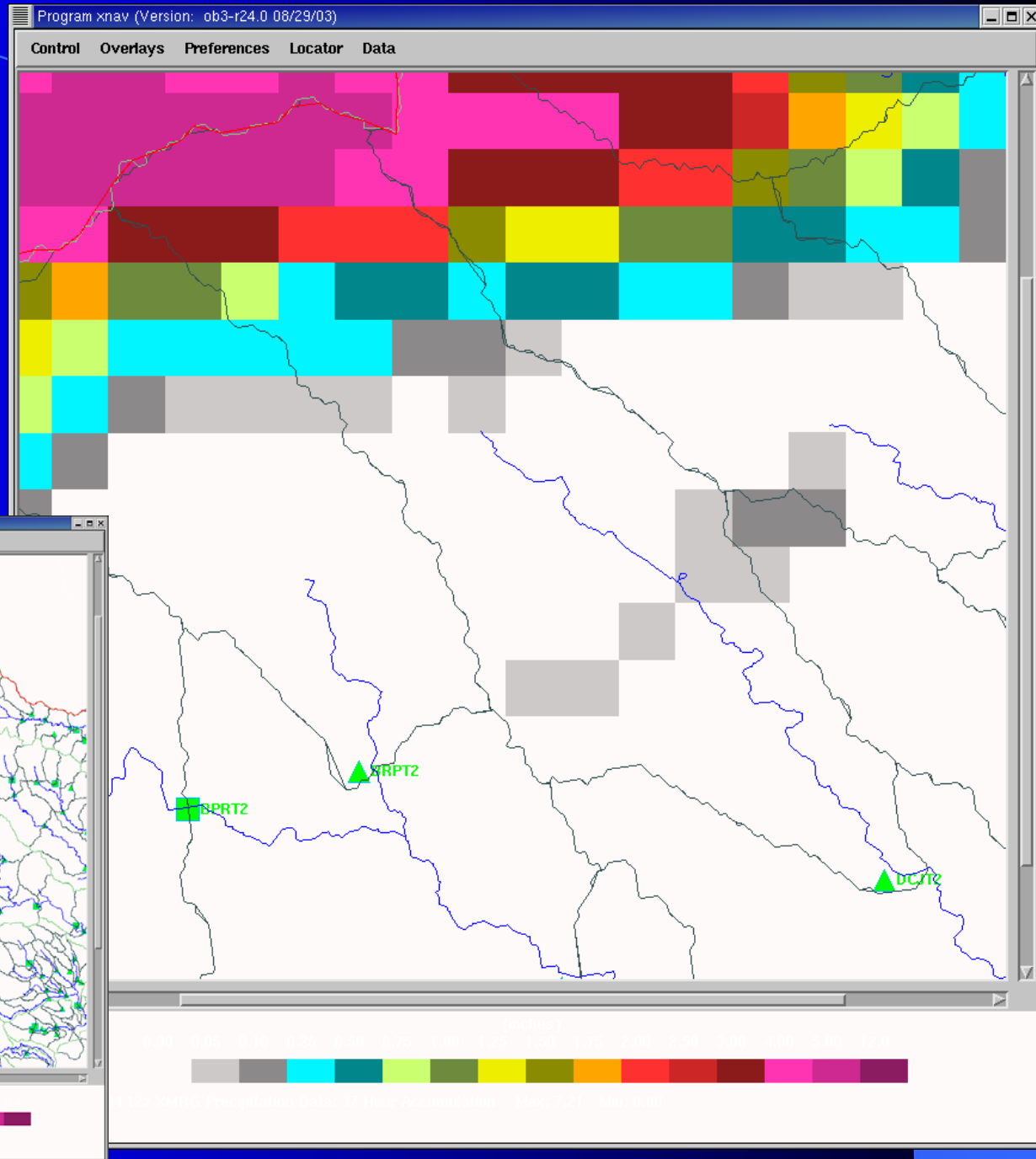
# SOLT2



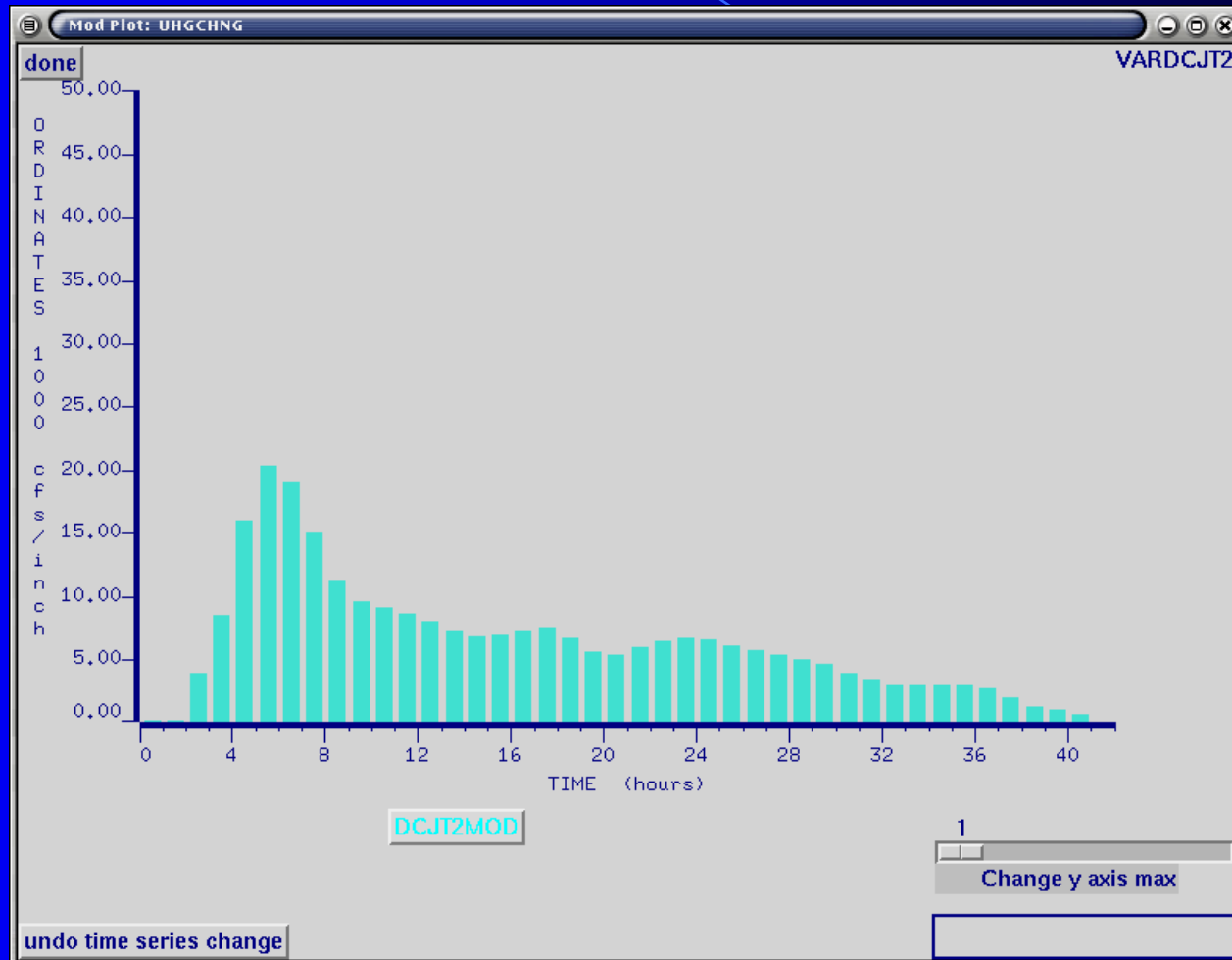
# Forecast Mode

- Runs once per hour on cron after mpe run.
- Generates QINH timeseries in processed database.
- View DMS forecast along with lumped in IFP.
- No interaction with forecast other than display.

# DCJT2 4/2004

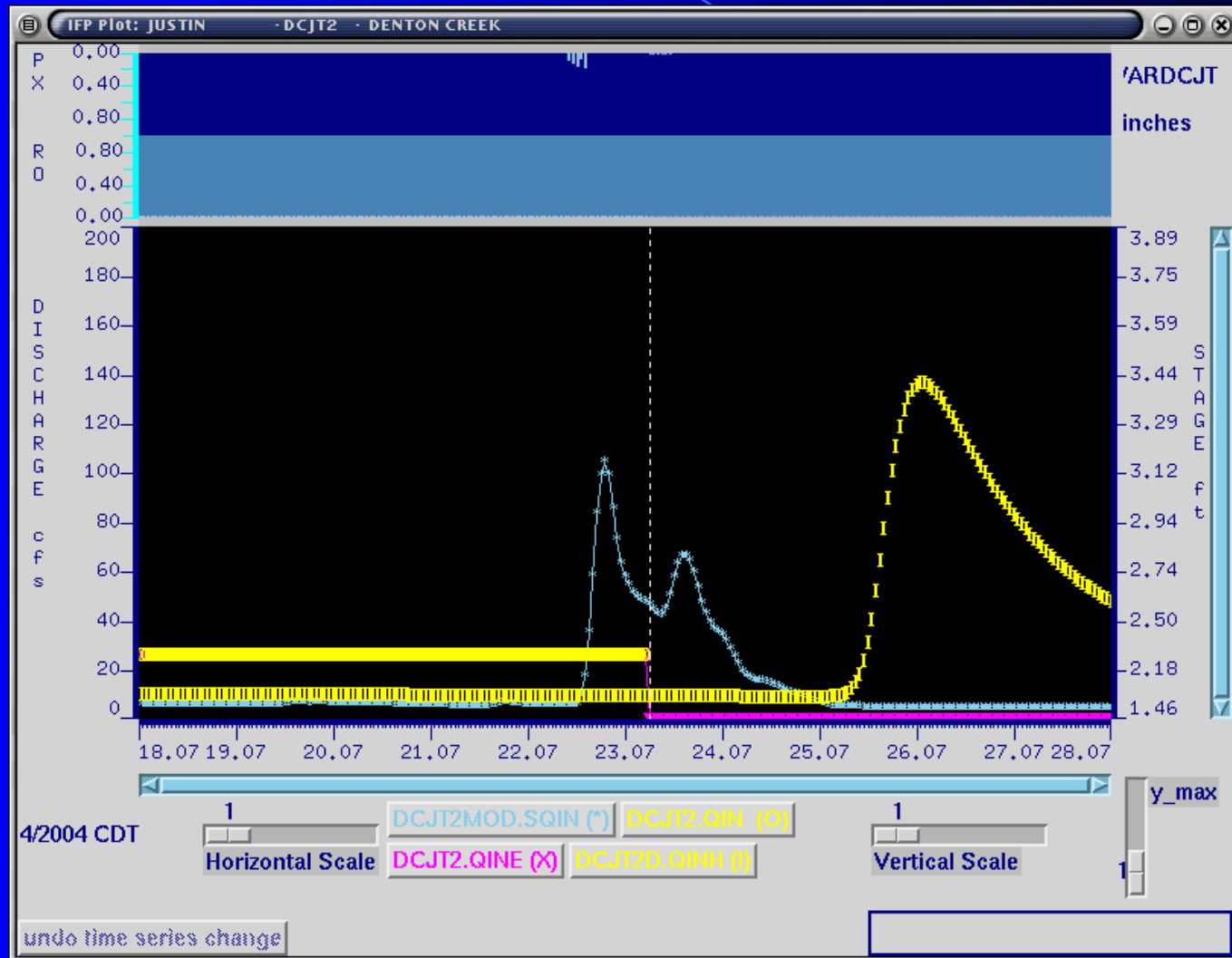


# 1 hour Unit Hydrograph





# Lumped & DMS Forecast



# Summary

- DMS appears to perform as well or better than lumped model for test basins.
- We will continue to setup and test basins concurrently with DMS development.
- We will continue to archive forecasts for quantitative verification.
- We look forward to integration with operational forecast system.

# Contacts

- Please contact the following people with any questions relating to DMS:
  - OHD Team :
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