ASCOT–01 Skill Metrics: Massachusetts Bay

The real–time simulation in ASCOT–01 was nested in a data driven GOM which was nested in a climatological NWA. These figures can be found in and below
`/home/projects/ASCOT/Tex/Skill/Jun19`

Initialization

- Data from June 2000 (ECOHAB, NMFS)
- June climatology from (MWRA, NMFS, NODC)
- Central time: 11706.5 (June 10, 2000 – 12:00)

OA Scales

	Synoptic	**Mean**
Decay (km)	25	224
Zero-Cross (km)	60	540
Time-Decay (day)	10	10000

- Run in nested mode for 7 days with June 2001 FNMOC atmospheric forcing.

Assimilation

- Data from June 6–15, 2001
- Central times:
  12067.5 (June 6, 2002 – 12:00)
  12068.5 (June 7, 2002 – 12:00)
  12069.5 (June 8, 2002 – 12:00)
  12070.5 (June 9, 2002 – 12:00) (GOM continuity)
  12072.75 (June 11, 2002 – 18:00)
  12073.5 (June 12, 2002 – 12:00)
  12074.65 (June 13, 2002 – 15:36)
  12076.14 (June 15, 2002 – 03:22)

OA Scales

	Synoptic	**Mean**
Decay (km)	6,12,20,20,20,20	224
Zero-Cross (km)	15,30,50,50,50,50	540
Time-Decay (day)	1,1,100,2,2,2	10000.0

- Ramping: on each assimilation day the above fields were assimilated according to the schedule

Ramping Weights

Time	**Weight**
$\tau - \frac{7}{8}$	0.2
$\tau - \frac{5}{8}$	0.667
$\tau - \frac{3}{8}$	0.875
$\tau - \frac{1}{8}$	0.99

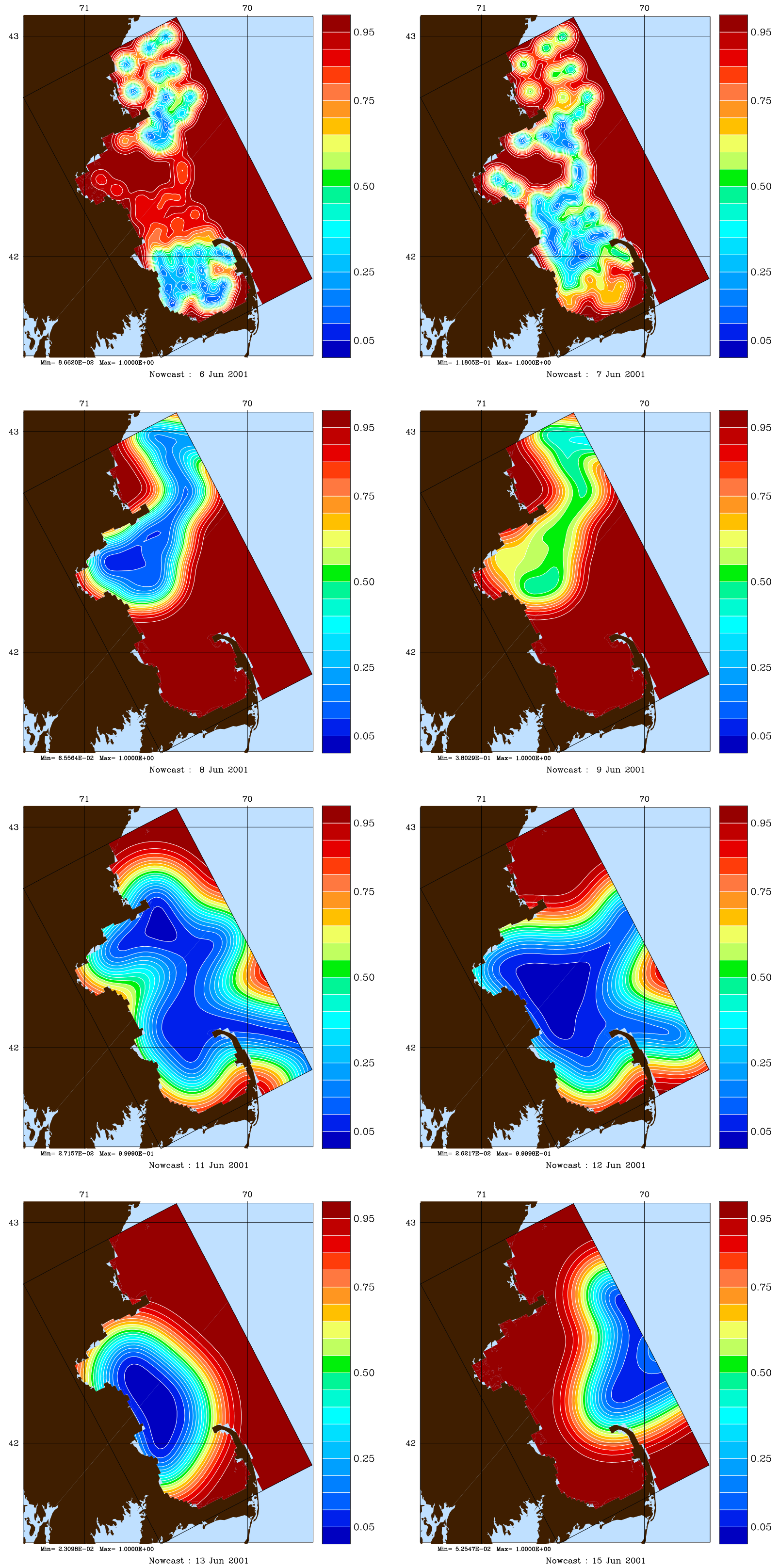

Figure 1: Observation errors produced by the objective analysis scales chosen for assimilation.

Verification

- Data from June 15–20, 2002 (Alliance CTD 136–190)
- Central time:
  12080.667 (June 19, 2001 – 16:00 UTC)

OA Scales

	Synoptic	**Mean**
Decay (km)	7.5	18.75
Zero-Cross (km)	84	202.5
Time-Decay (day)	1.0	10000.0

The RMS & PCC statistics are restricted to regions where the observation errors are less then or equal to 0.3 (figure 2). These statistics are computed at constant depths. Some primary depths are chosen from the vertical structure of the verification fields (figure 3).

Primary Depths

Depth (m)	**Rational**
2	Surface Mixed Layer
10	Center of the Thermocline Center of the Pycnocline Center of the Halocline
40	Deep Conditions

This set of test depths is "padded" with additional test depths at 5m and 20m.

Since the initialization is made with historical (June 2000) data, "persistence" is defined (for comparison purposes) as the fields in Massachusetts Bay after assimilating the initialization surveys (June 6–8, 2001).

Above the "oclines" (10m) all statistics show an advantage to the forecast over the persistence fields.

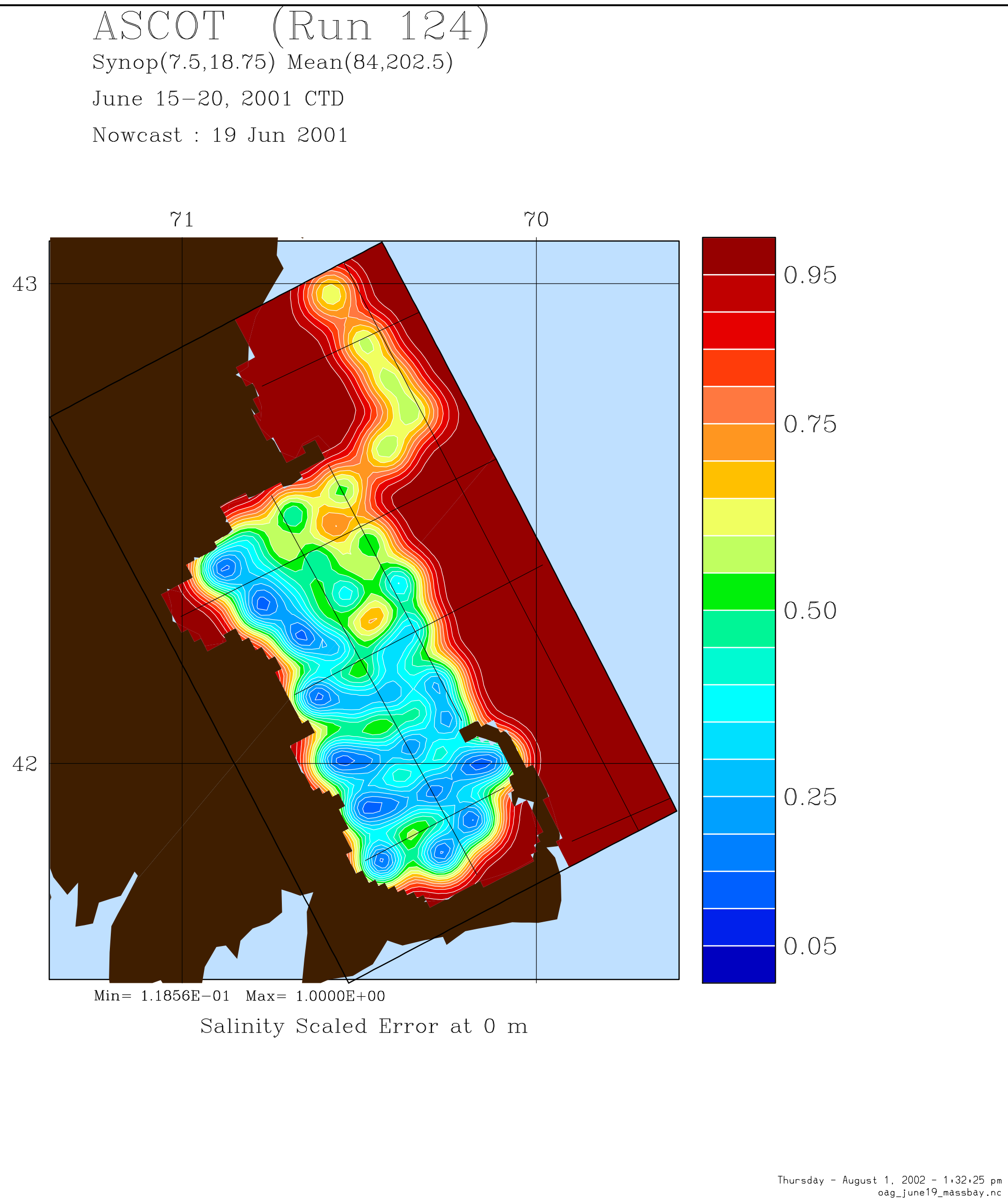

Figure 2 : Salinity error fields for verification.

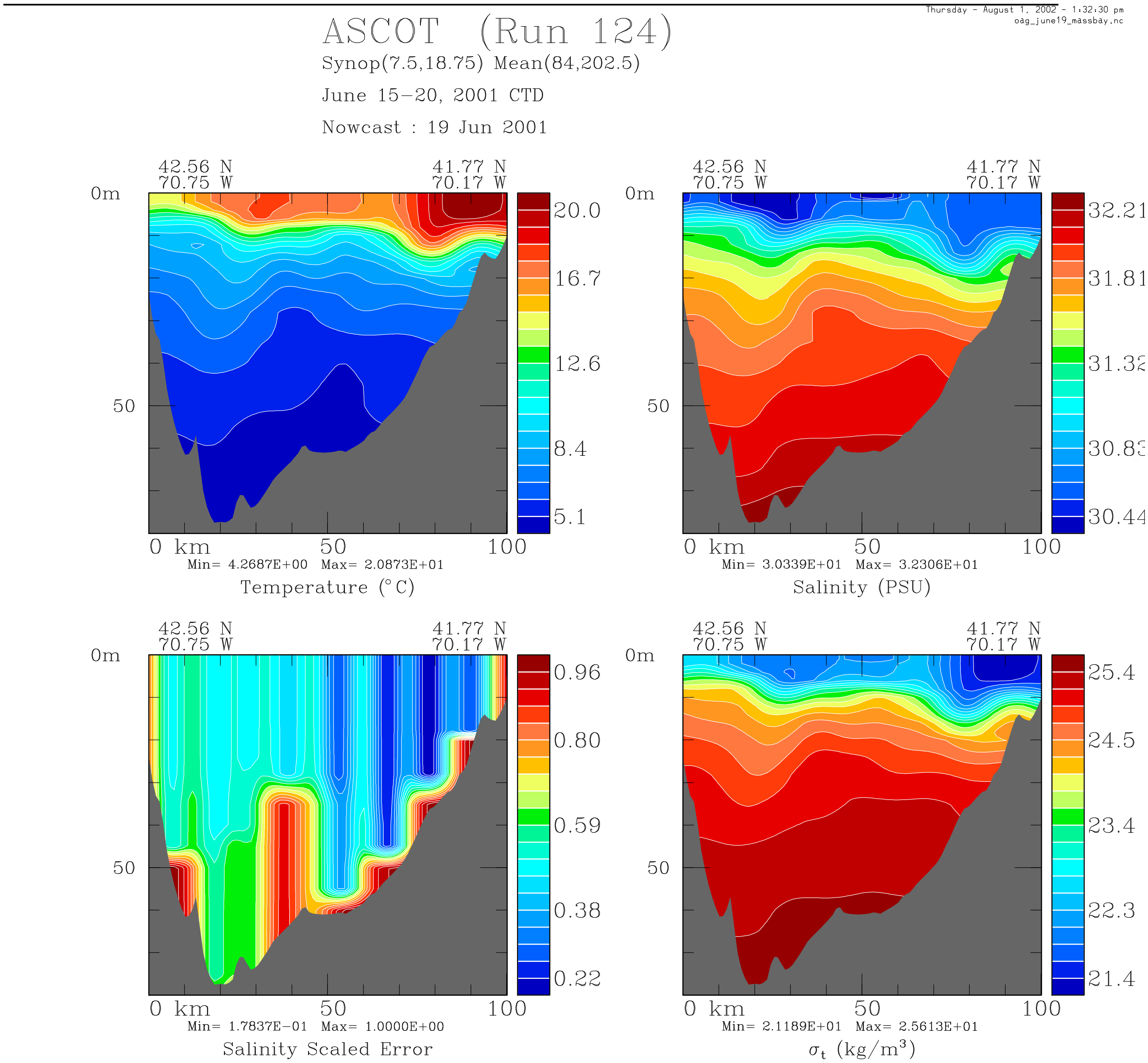

Figure 3 : Vertical structure of verification fields used to select skill metric depths.

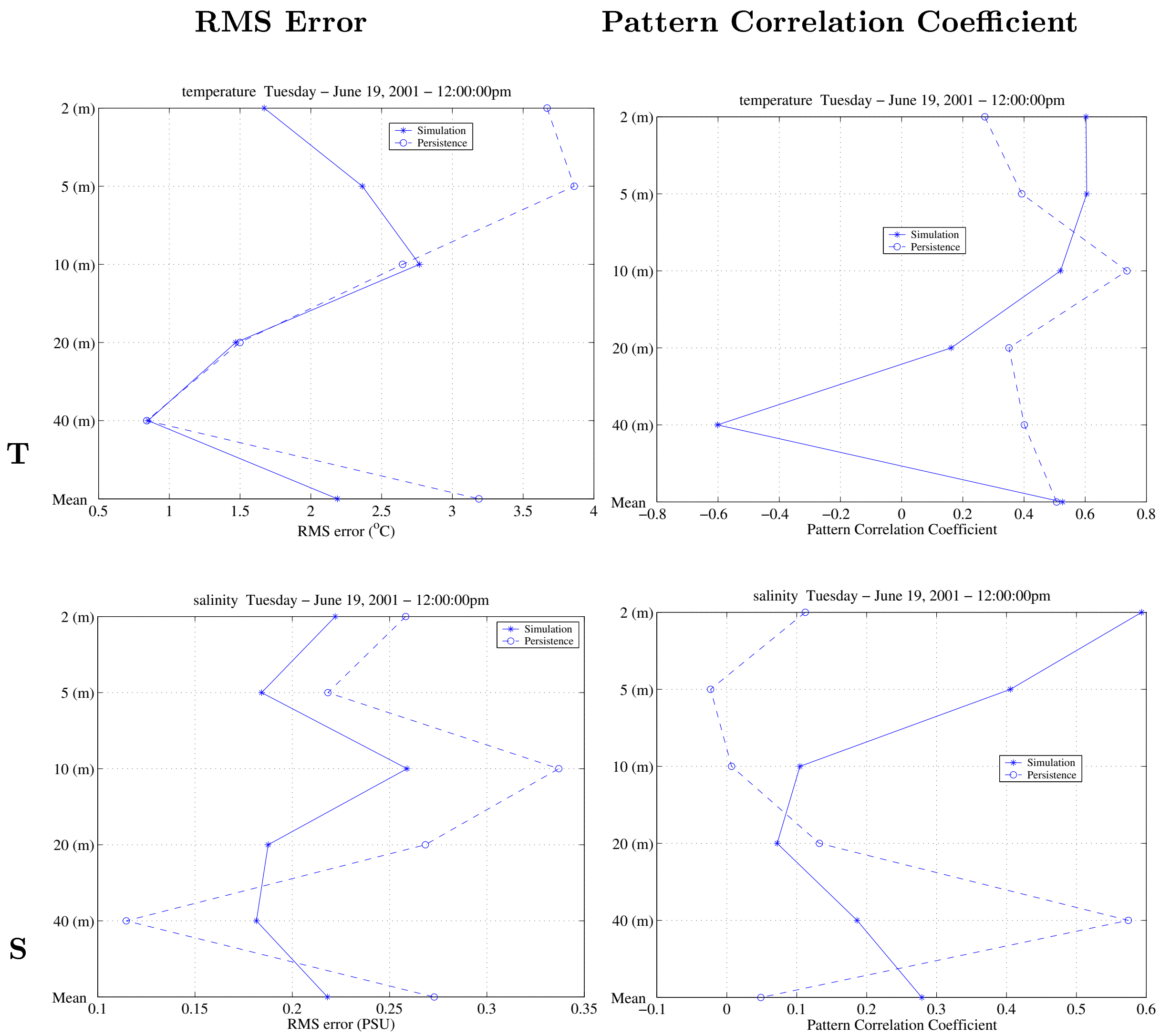

Figure 4: Comparison of forecast and persistence to verification fields. The mean fields in the PCC are arithmetic means of the selected test points.

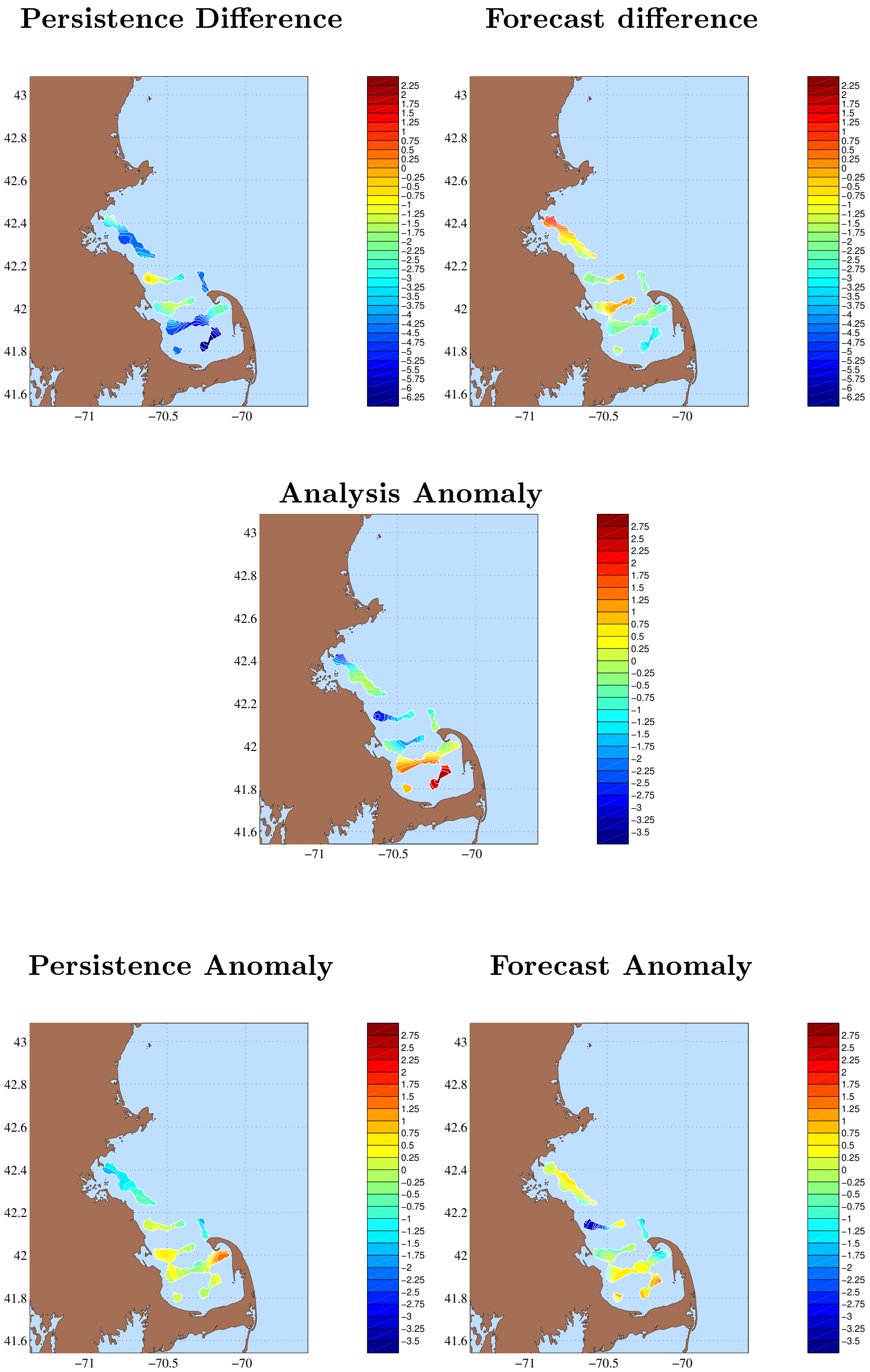

Figure 5: 2m temperature skill metric fields on May 19.

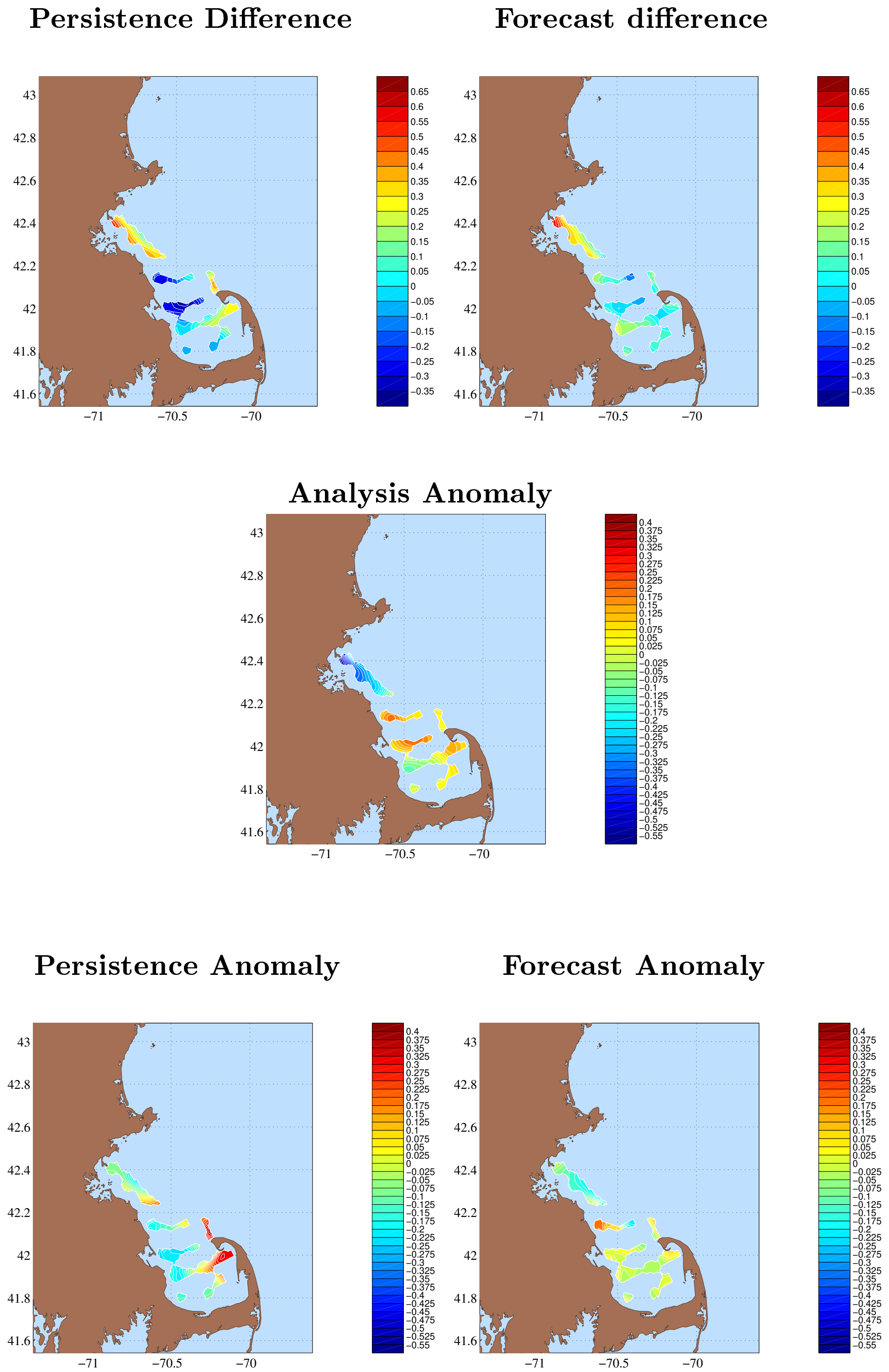

Figure 6: 2m salinity skill metric fields on May 19.