ASCOT–02 Skill Metrics

These figures can be found in and below
`/home/projects2/ASCOT02/Tex/Skill`

The final real–time simulation in ASCOT–02 was a 10 day run with output every $\frac{1}{2}$ day.

Initialization

- Data from May 7–10, 2002 (casts 1–95)
- Central time: 12402.0 (May 7, 2002 – 00:00)

OA Scales

	Synoptic	**Mean**
Decay (km)	10	250
Zero-Cross (km)	25	625
Time-Decay (day)	1000	1000

Assimilation

- Data from May 7–14, 2002 (casts 1–184)
- Central times:
  12402.75 (May 7, 2002 – 18:00)
  12403.75 (May 8, 2002 – 18:00)
  12404.75 (May 9, 2002 – 18:00)
  12405.75 (May 10, 2002 – 18:00)
  12406.75 (May 11, 2002 – 18:00)
  12407.75 (May 12, 2002 – 18:00)
  12408.75 (May 13, 2002 – 18:00)

OA Scales

	Synoptic	**Mean**
Decay (km)	10	100
Zero-Cross (km)	25	250
Time-Decay (day)	1.0	10.0

- Ramping: on each day (May 7–13) the above fields were assimilated according to the schedule

Ramping Weights

Time	**Weight**
12:14:24	0.33
15:00	0.66
18:00	0.99

Note: The first assimilation is 4 time steps after 12:00 to ensure that the output fields don't prematurely show the assimilation.

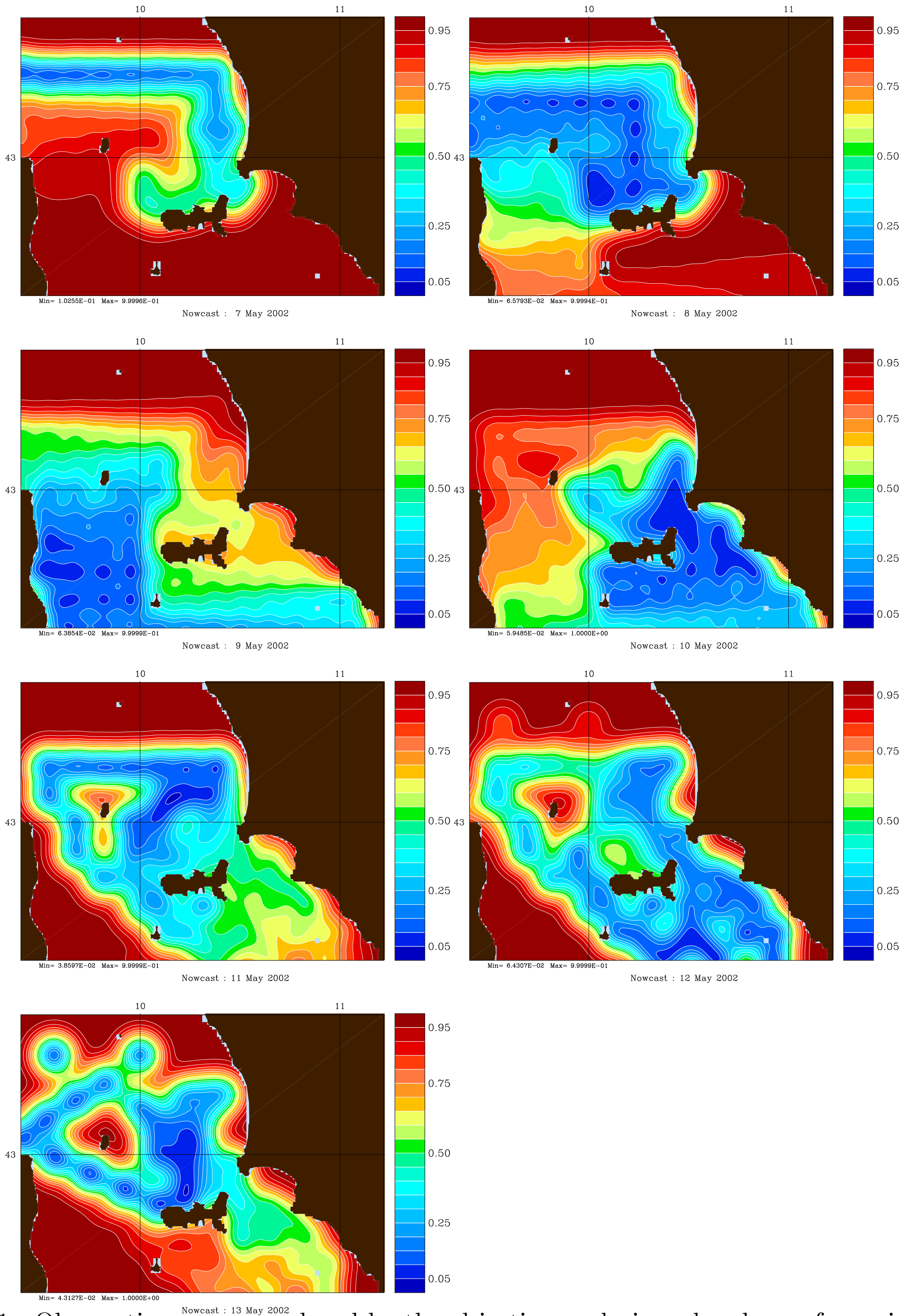

Figure 1: Observation errors produced by the objective analysis scales chosen for assimilation.

Verification

- Data from May 14–17, 2002 (CTD 188–274, XCTD 4, 6–9)
- Central times:
  12410.5 (May 15, 2002 – 12:00)
  12411.5 (May 16, 2002 – 12:00)

OA Scales

	Synoptic	**Mean**
Decay (km)	7.5	18.75
Zero-Cross (km)	75	187.5
Time-Decay (day)	1.0	10.0

The RMS & PCC statistics are restricted to regions where the observation errors are less then or equal to 0.2 (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
20	Center of the Thermocline
40	Center of the Pycnocline
200	Center of the Halocline
400	Deep (quiescent) Conditions

These depths are "padded" with 10m and 100m.

Comparing the verification errors (figure 2) to the assimilation errors (figure 1) shows that a significant portion of the May 15th comparison has gone un-updated for a longer period than the May 16th comparison. This explains the general superior results for May 16 in figure 4. The temperature forecast is superior to persistence in and above the thermocline in both statistics and superior in RMS to the pycnocline. The salinity forecast is superior to persistence in and above the thermocline in both statistics except for the surface May 15th fields.

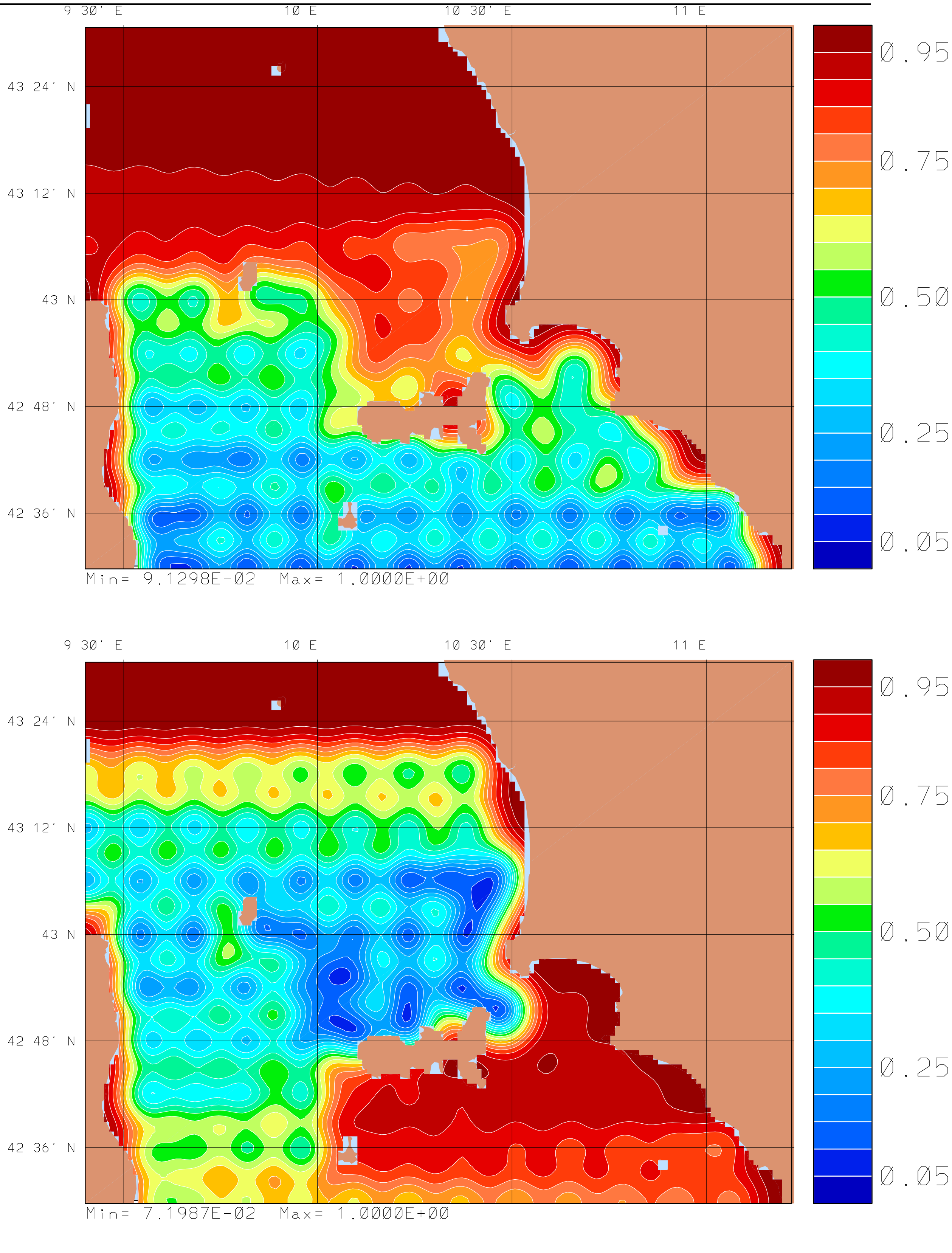

Figure 2 : Salinity error fields for verification. Top: surface errors for May 15, Bottom: surface errors for May 16.

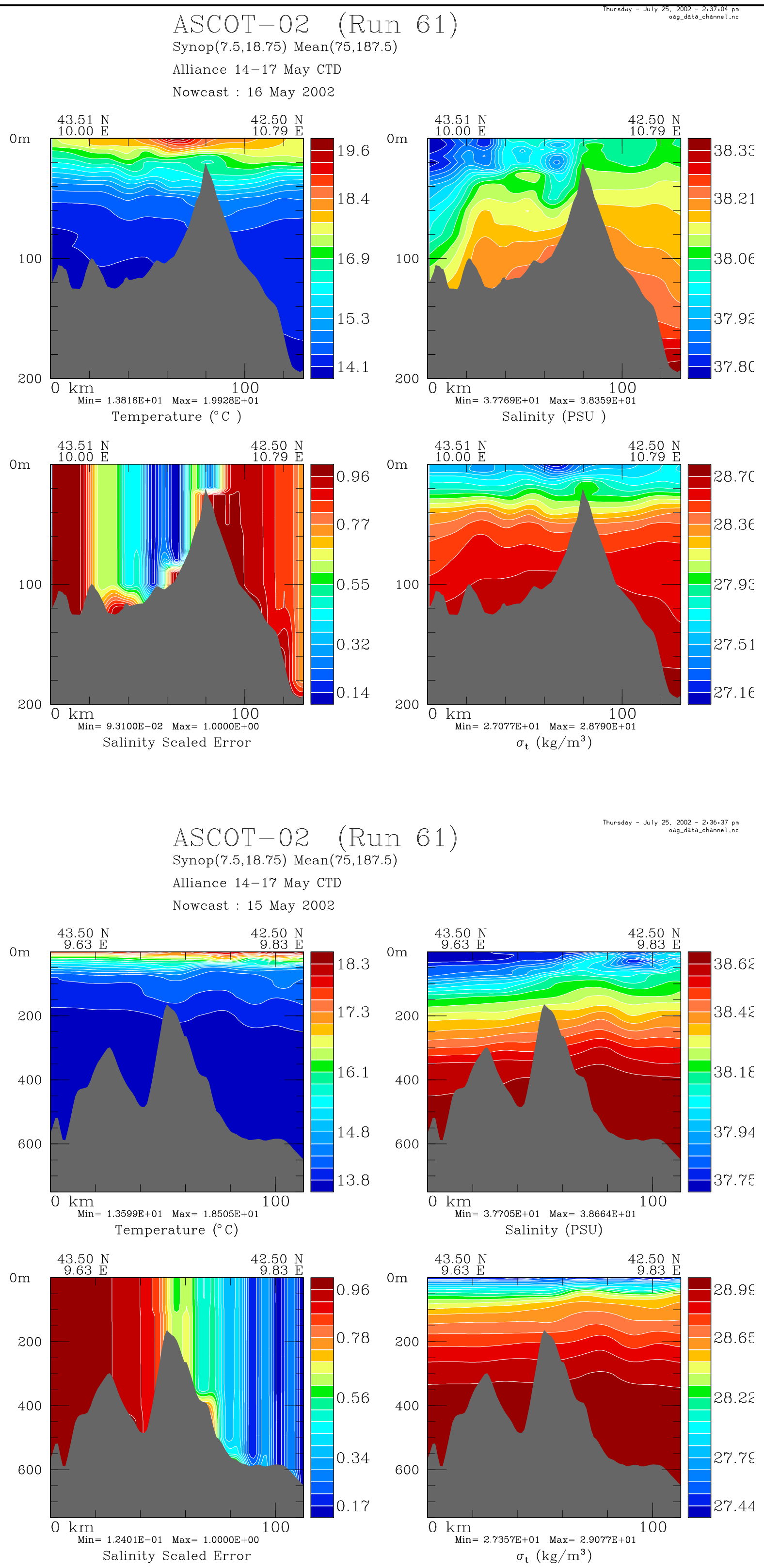

Figure 3 : Vertical structure of verification fields used to select skill metric depths. Top panel, vertical section in Piombino Channel. Bottom panel, vertical section in Corsican Channel.

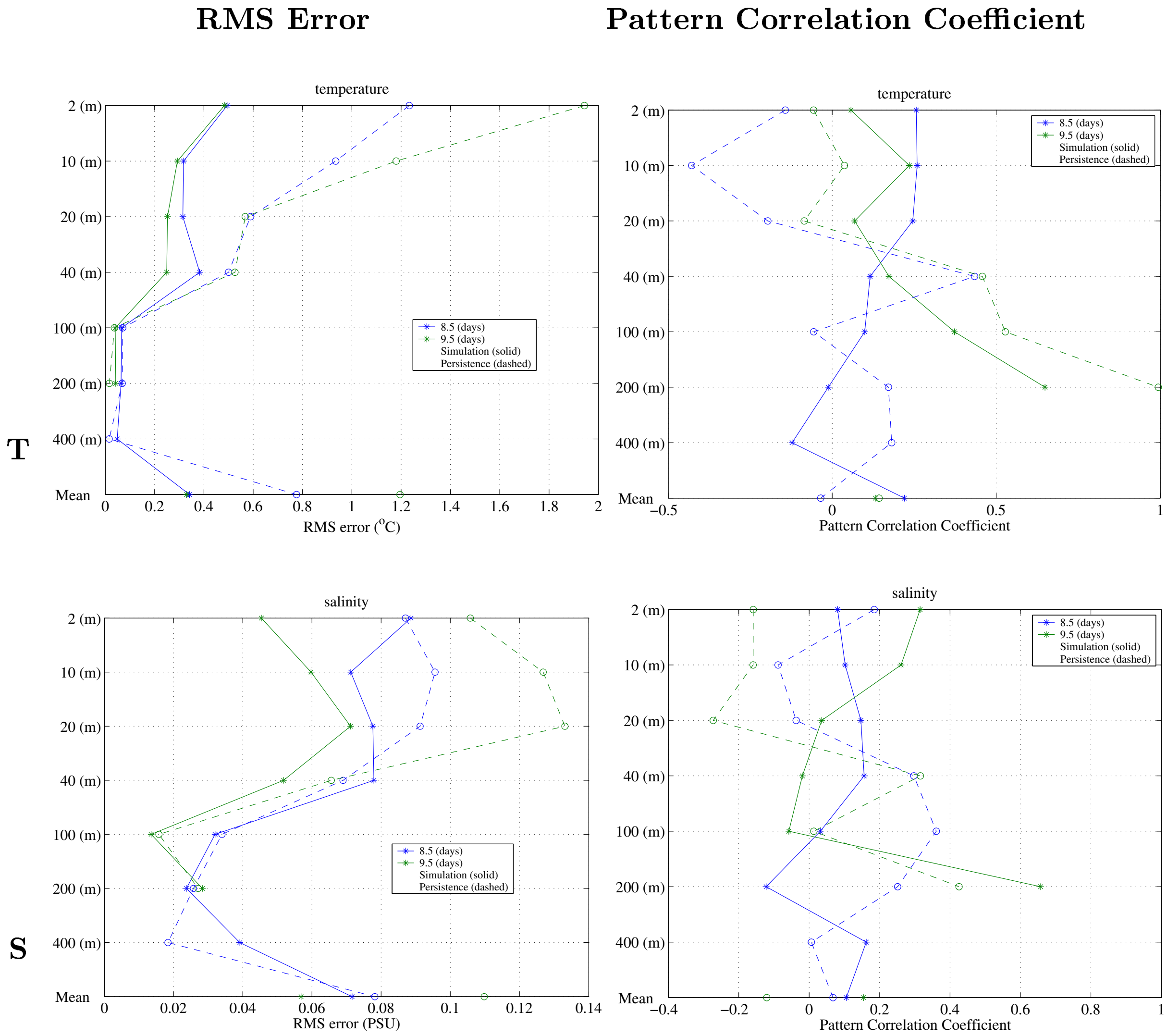

Figure 4: Comparison of forecast and persistence to verification fields on May 15 (blue) and May 16 (green).

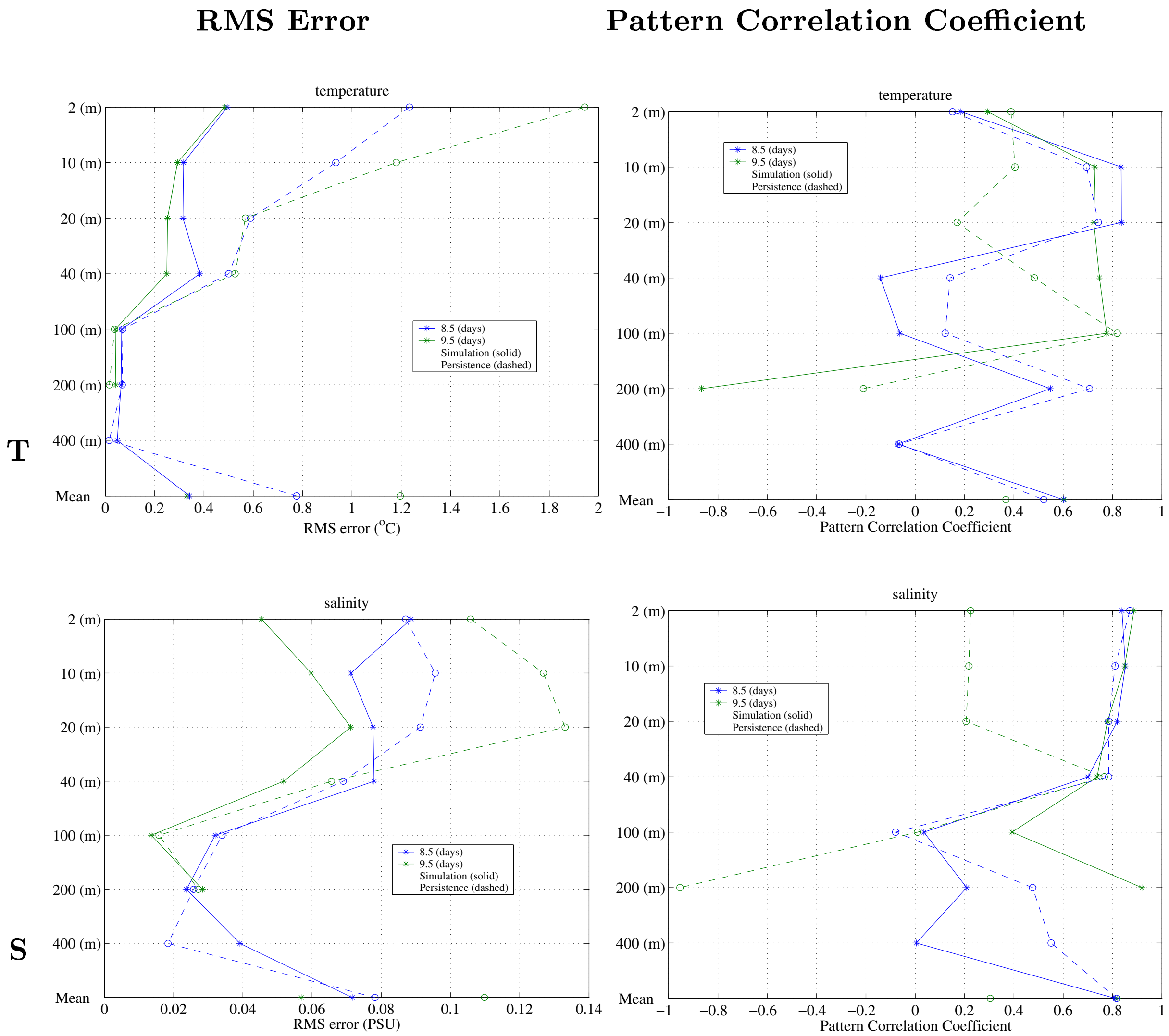

Figure 5: Comparison of forecast and persistence to verification fields on May 15 (blue) and May 16 (green). The mean fields are simpler: an arithmetic mean of the test points for each (persistence, forecast, analysis).

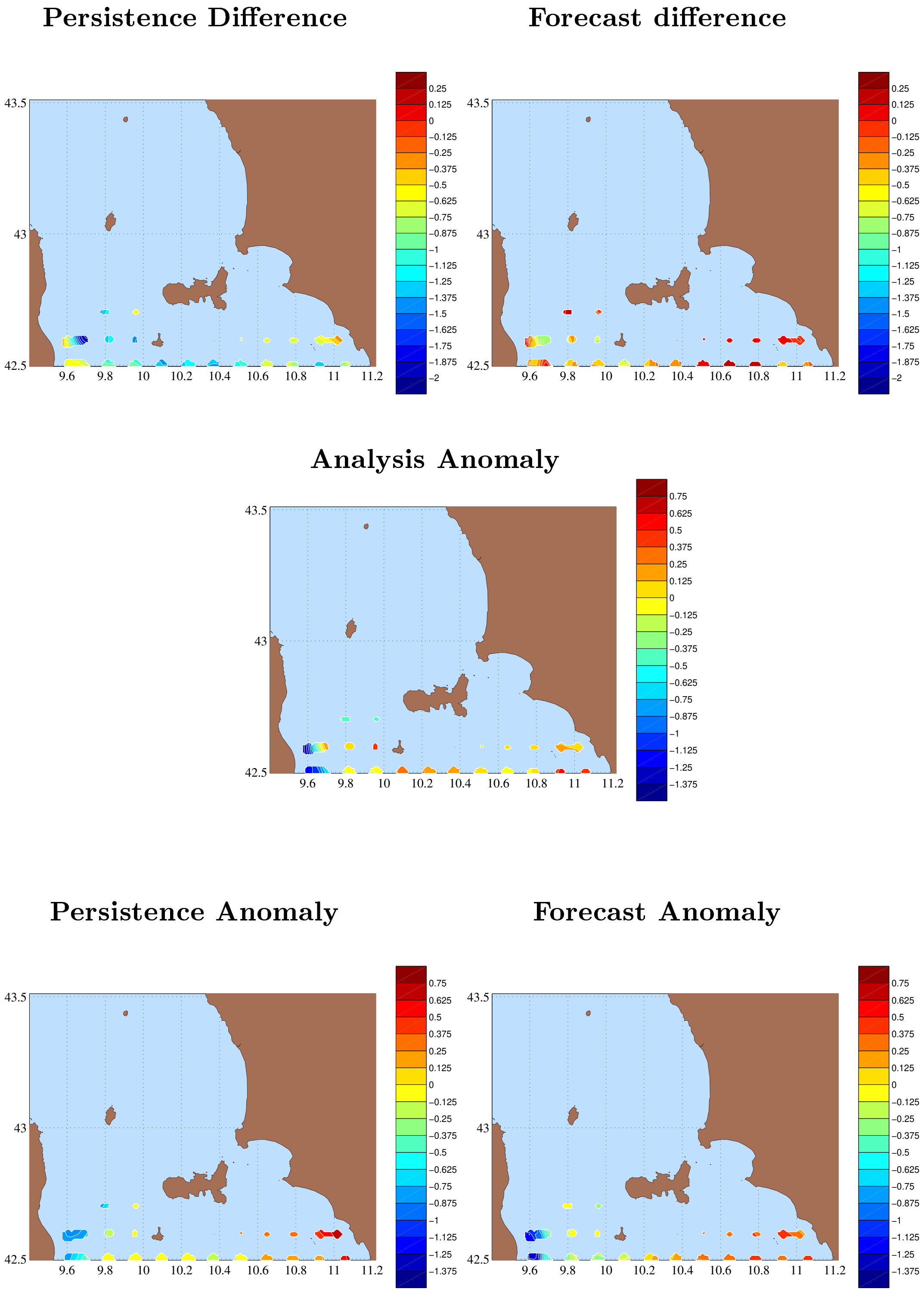

Figure 6: 10m temperature skill metric fields on May 15.

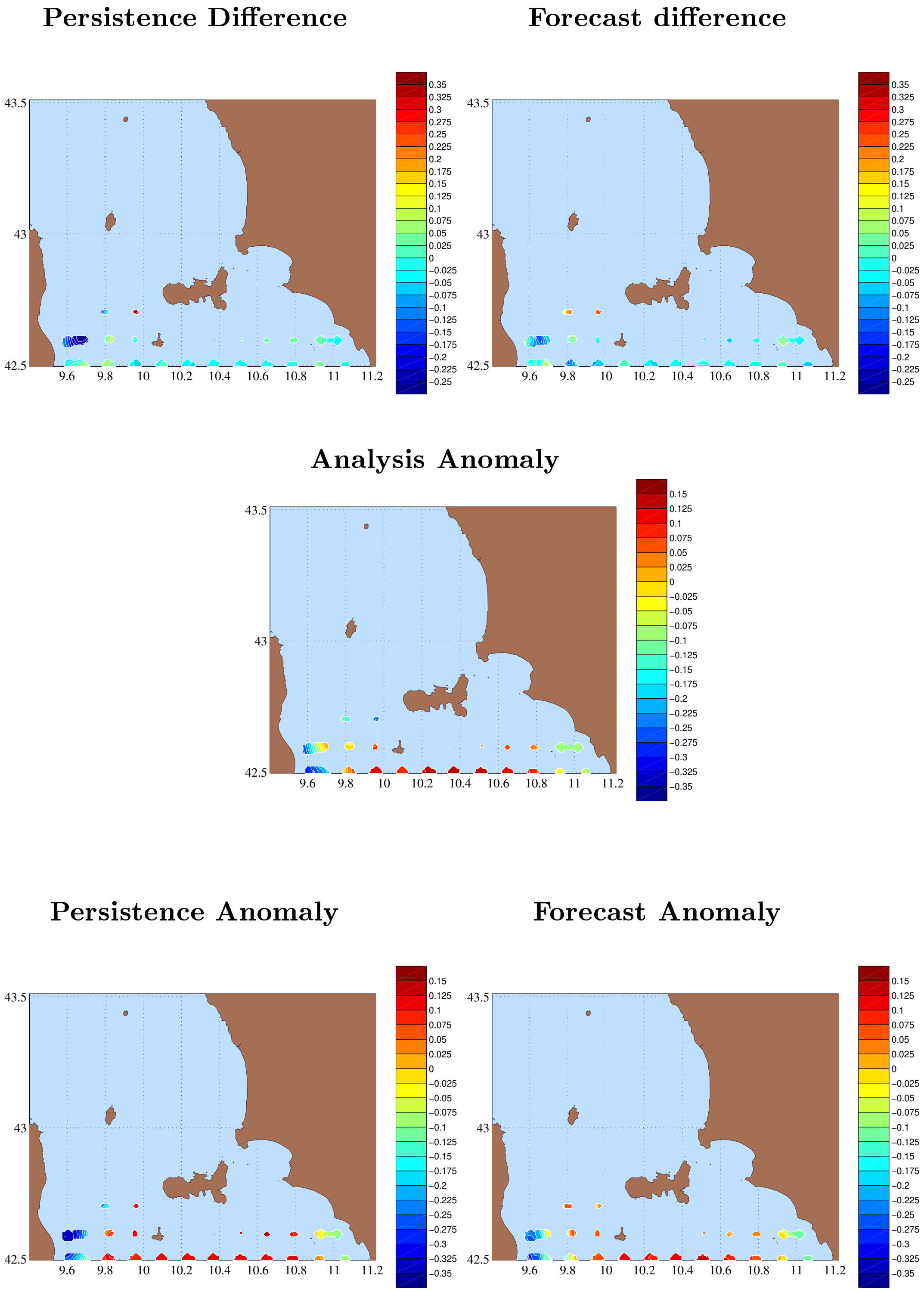

Figure 7: 10m salinity skill metric fields on May 15.

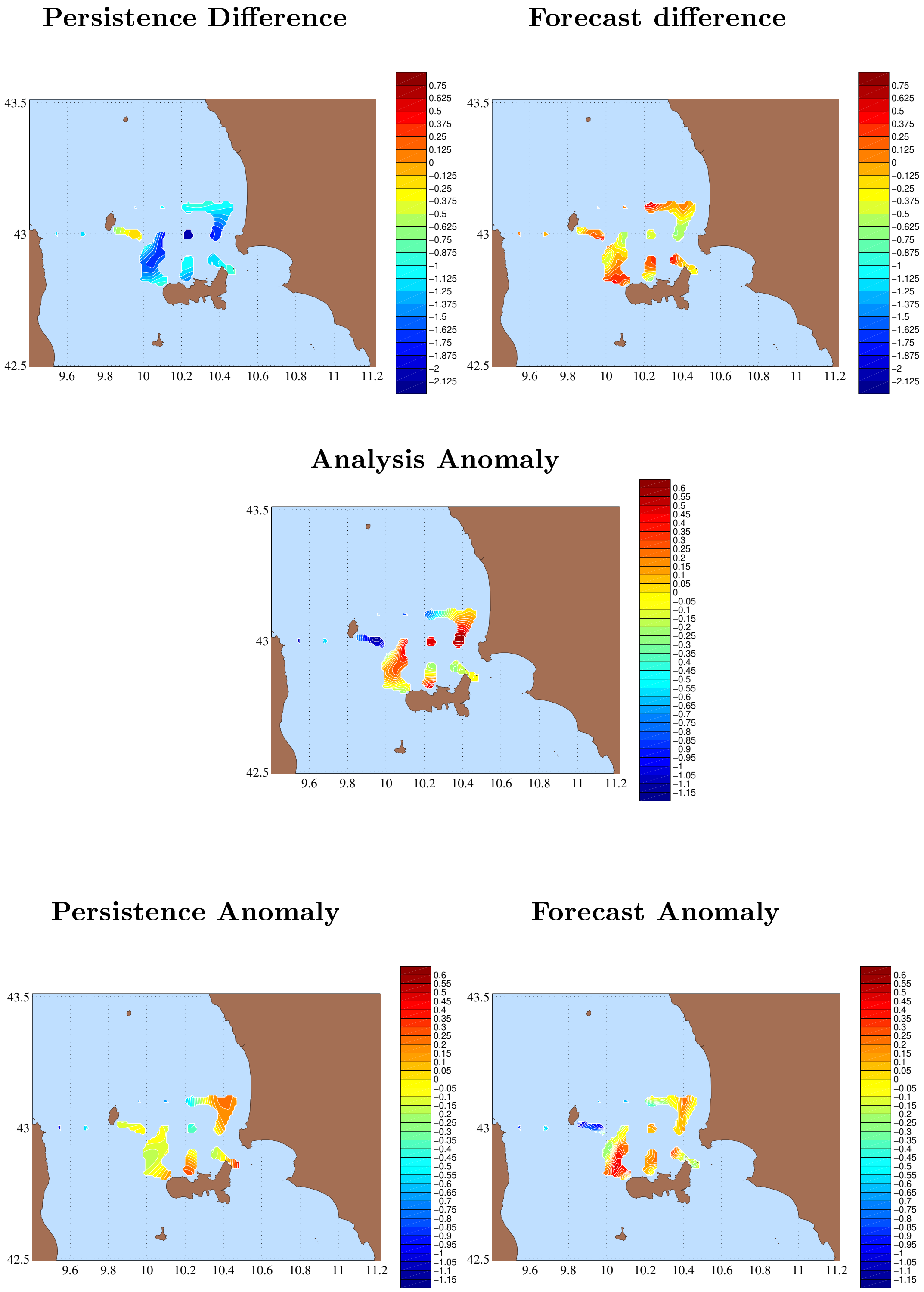

Figure 8: 10m temperature skill metric fields on May 16.

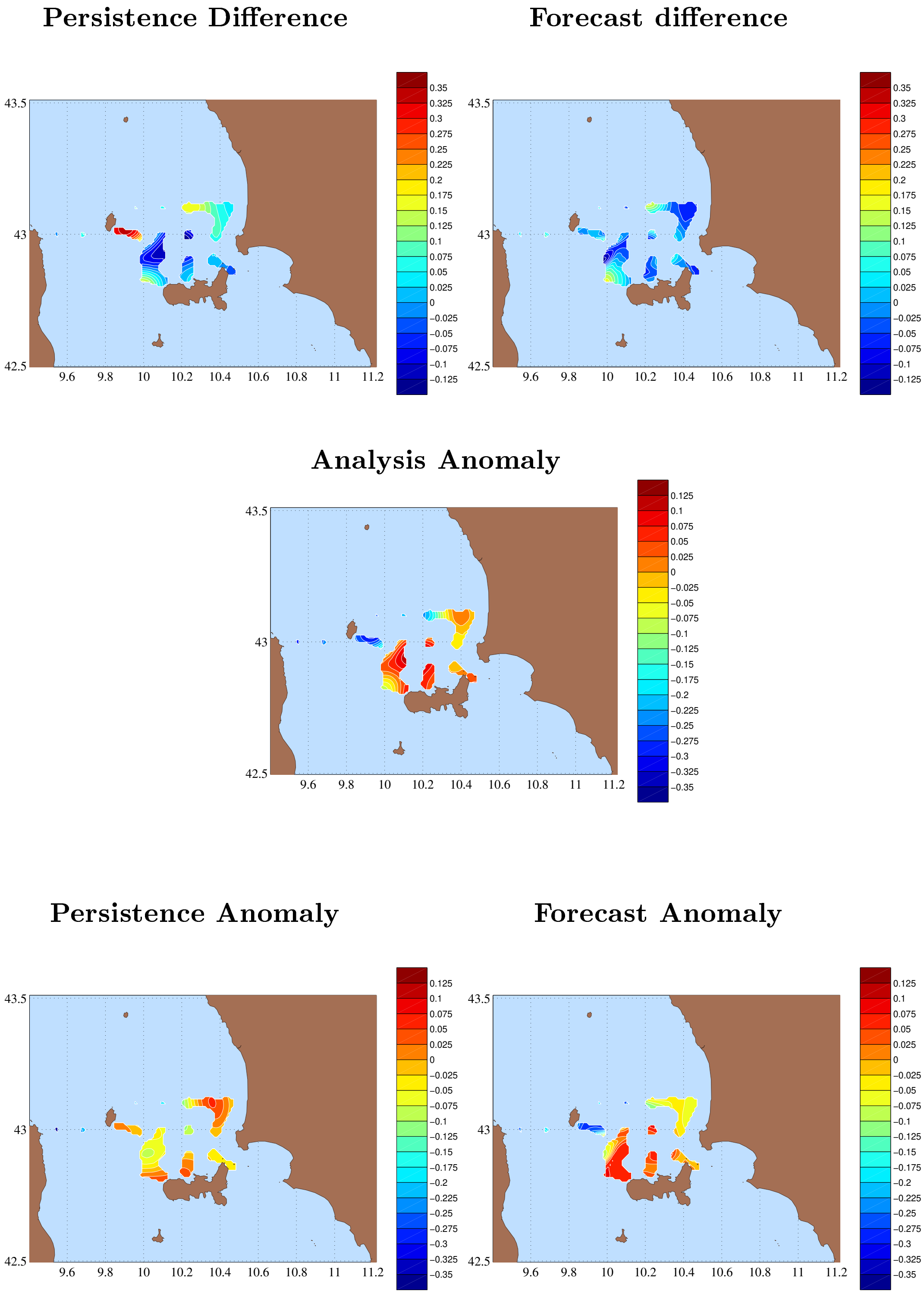

Figure 9: 10m salinity skill metric fields on May 16.