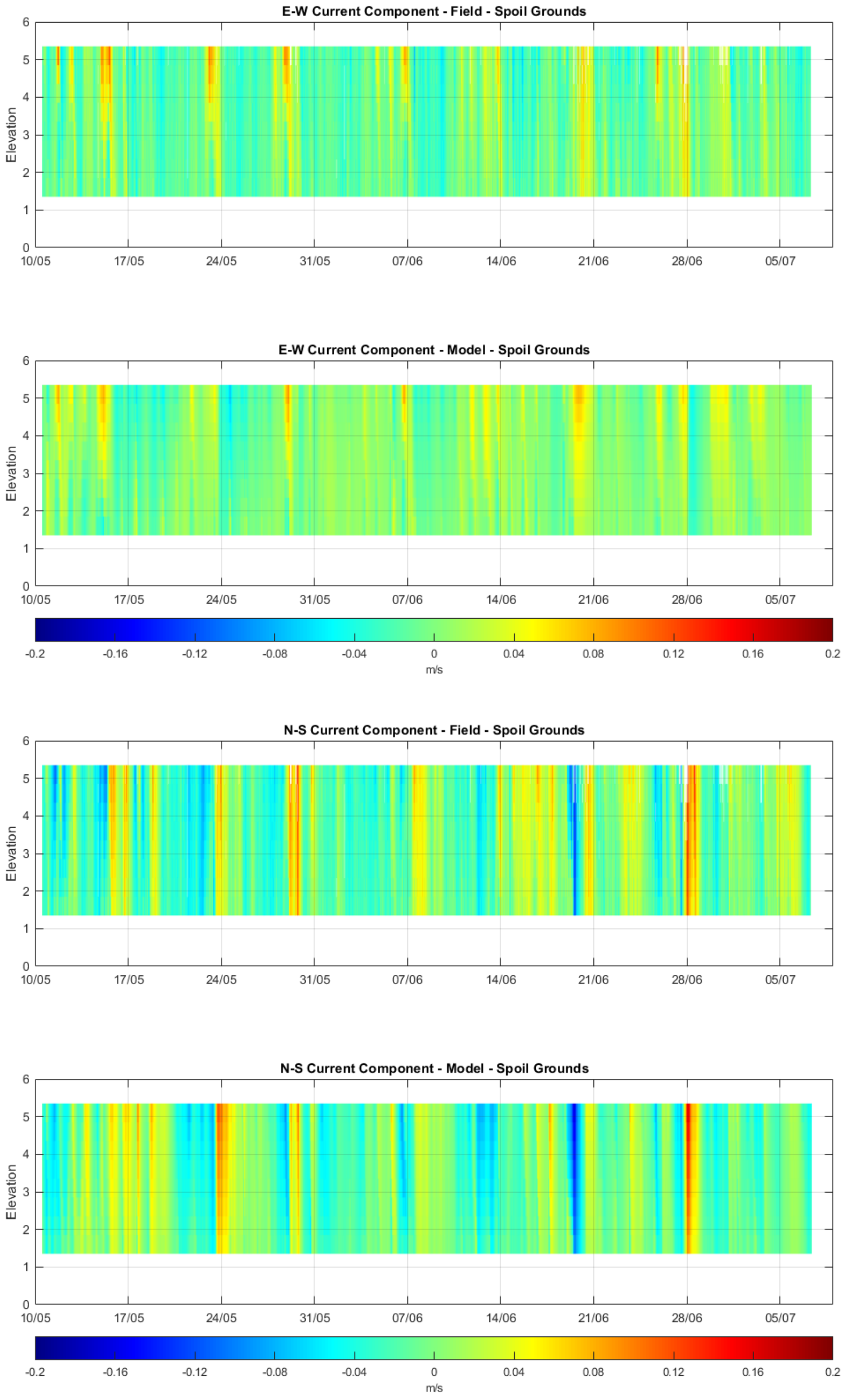

Figure 5-7 Comparisons between simulated velocities and ADCP measurements at Spoil Grounds for May to July 2006

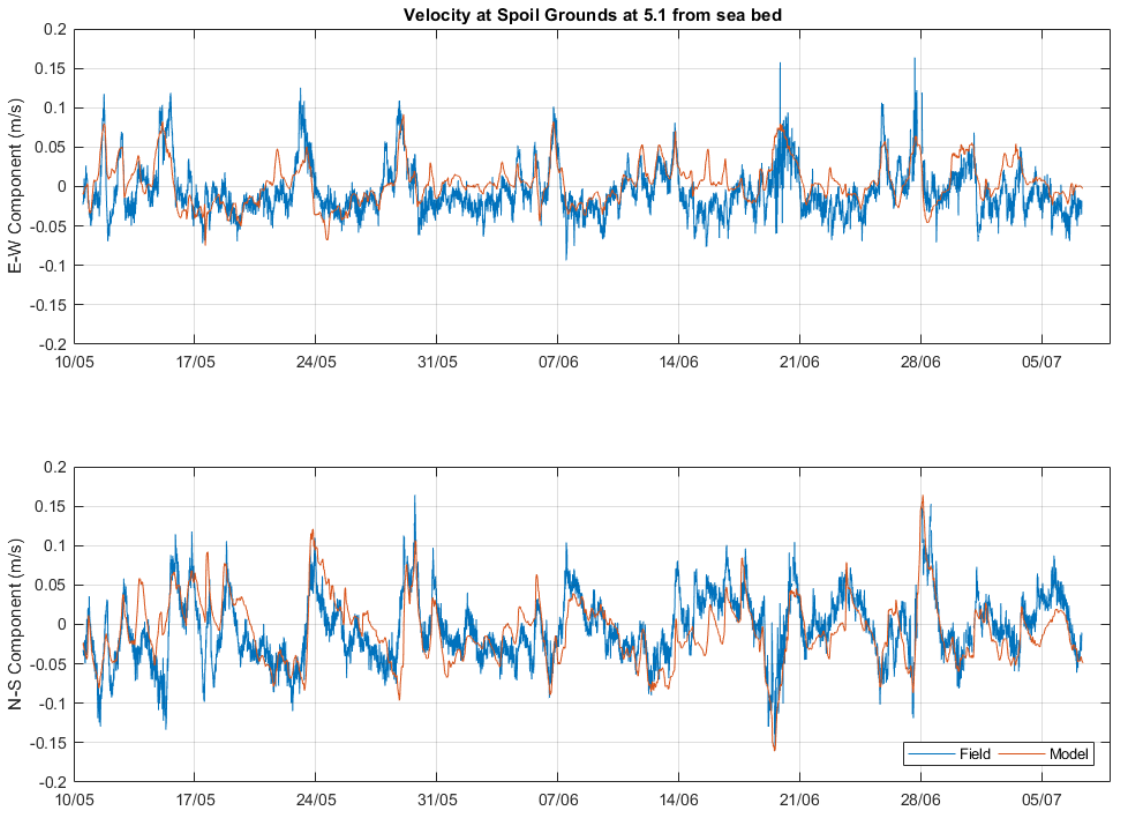

Figure 5-8 Comparison between simulated and measured ADCP velocities at 5.1m from sea bed at Spoil Grounds for May to July 2006

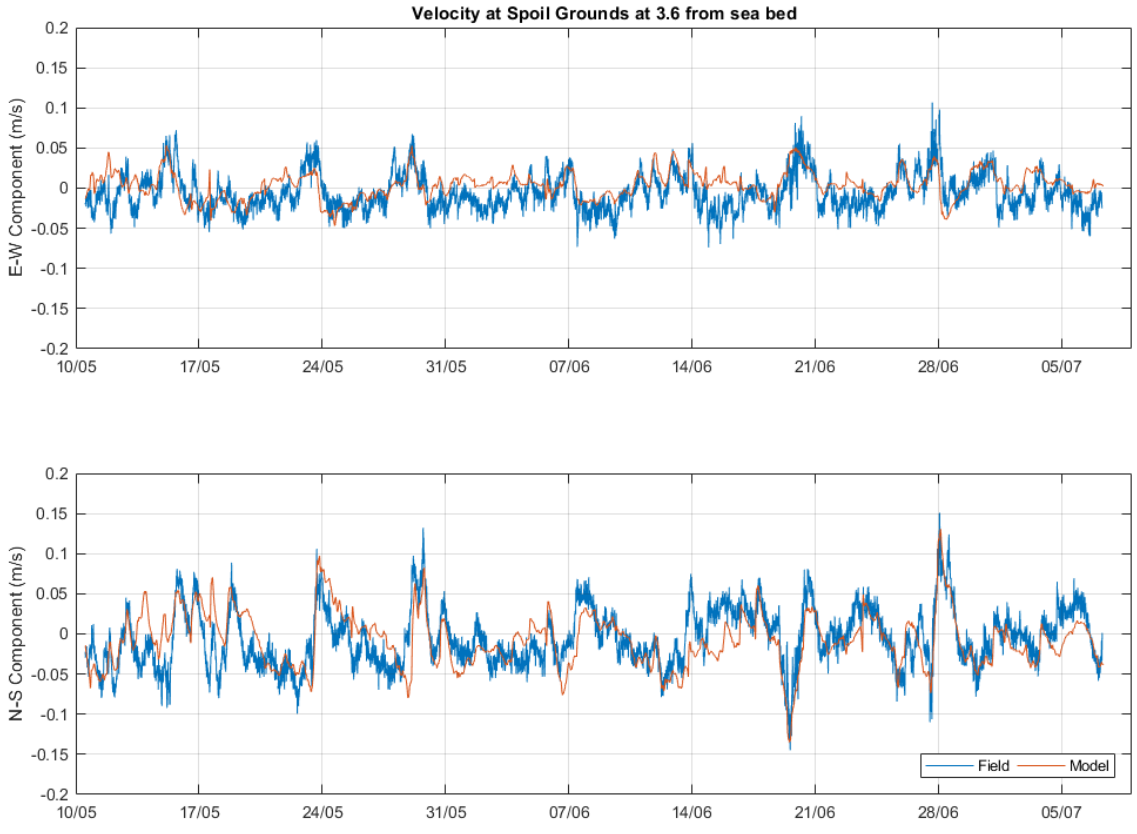

Figure 5-9 Comparison between simulated and measured ADCP velocities at 3.6m from sea bed at Spoil Grounds for May to July 2006

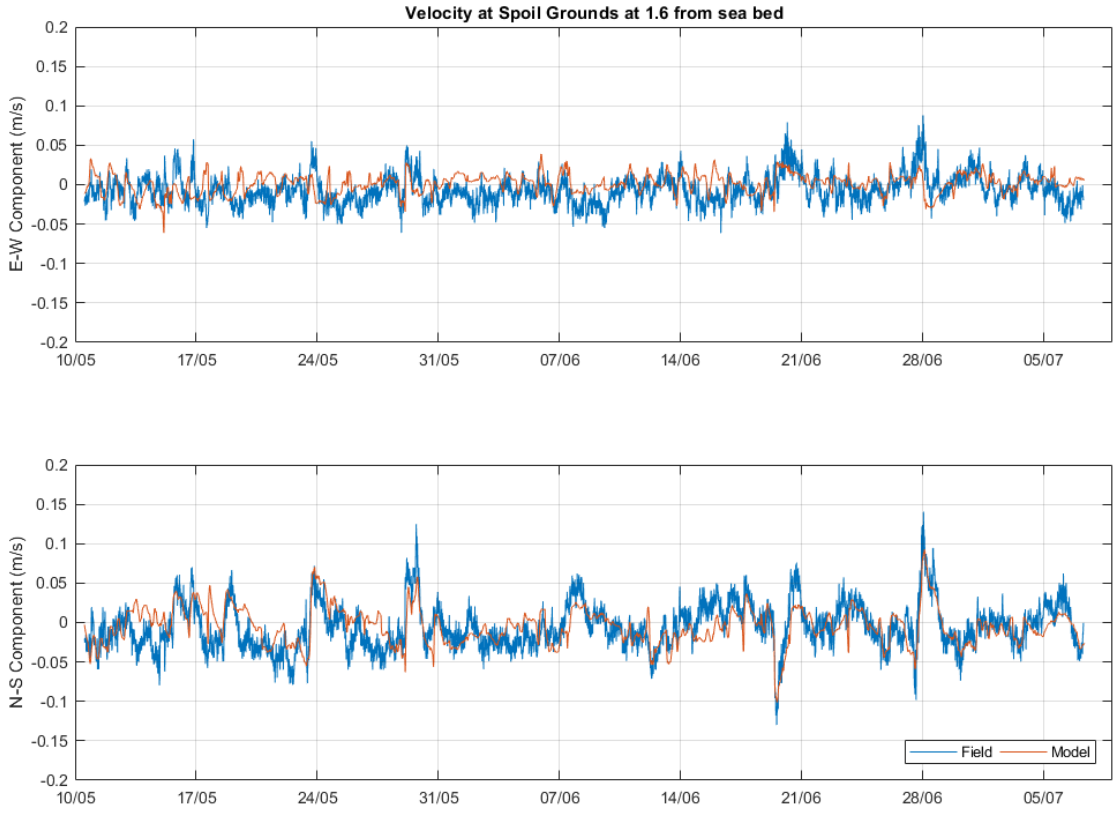

Figure 5-10 Comparison between simulated and measured ADCP velocities at 1.6m from sea bed at Spoil Grounds for May to July 2006

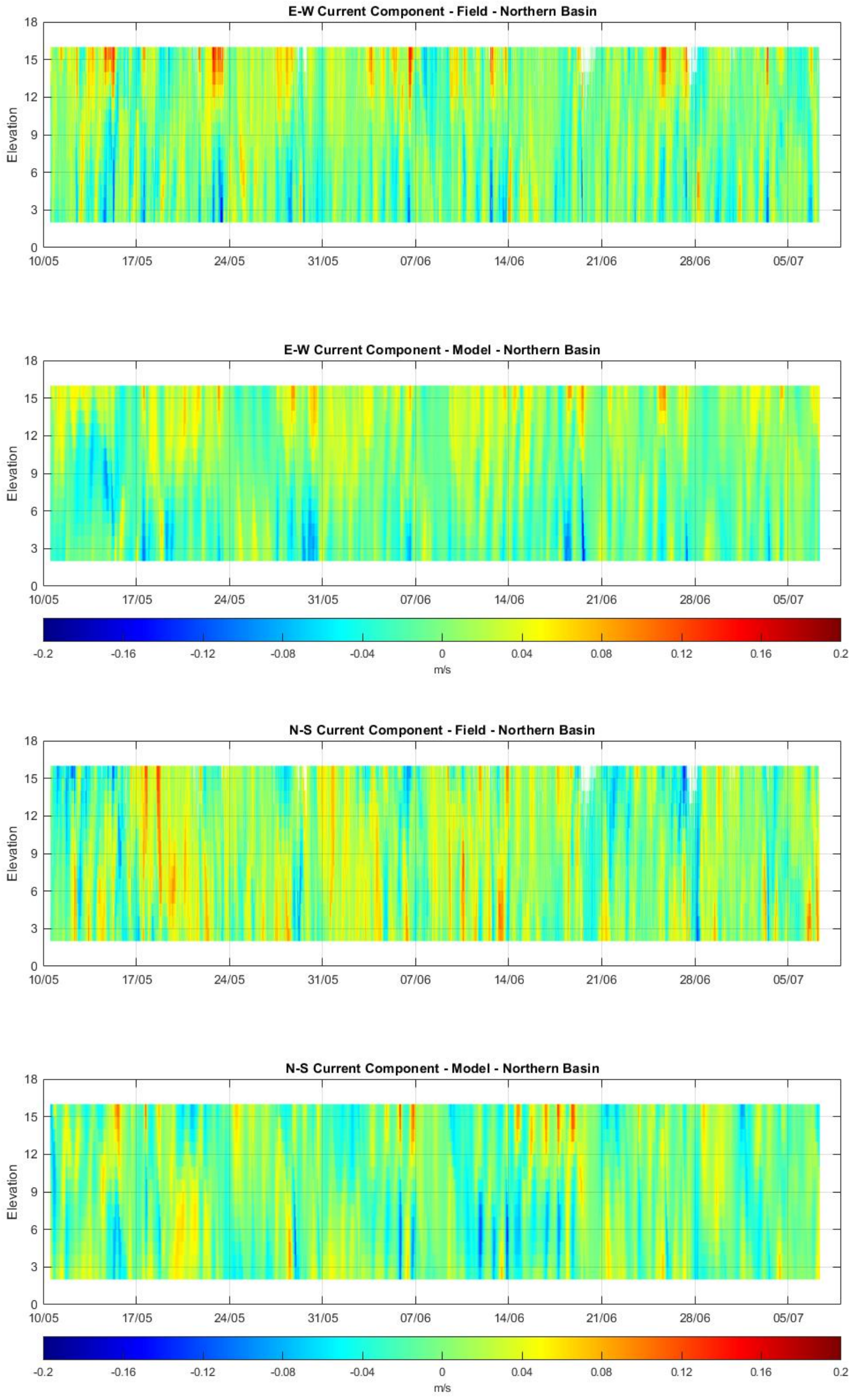

Figure 5-11 Comparisons between simulated velocities and ADCP measurements at Northern Basin for May to July 2006

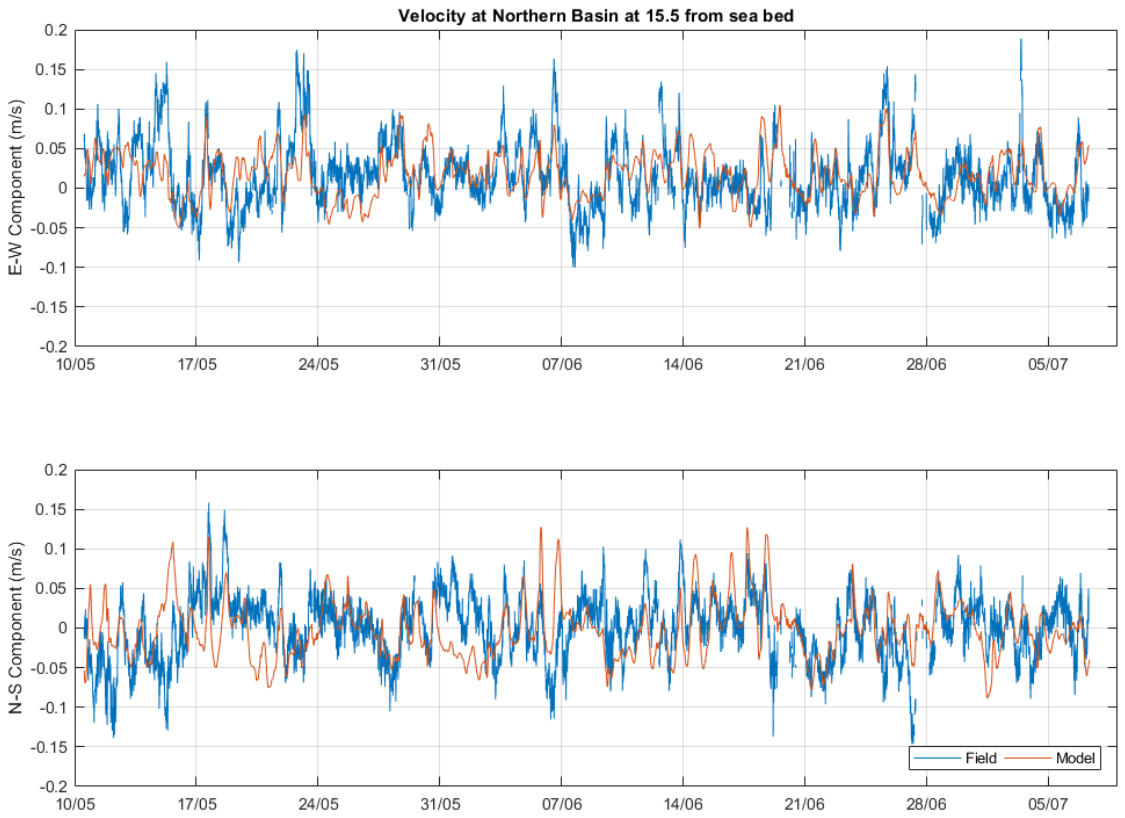

Figure 5-12 Comparison between simulated and measured ADCP velocities at 15.5m from the sea bed at Northern Basin for May to July 2006

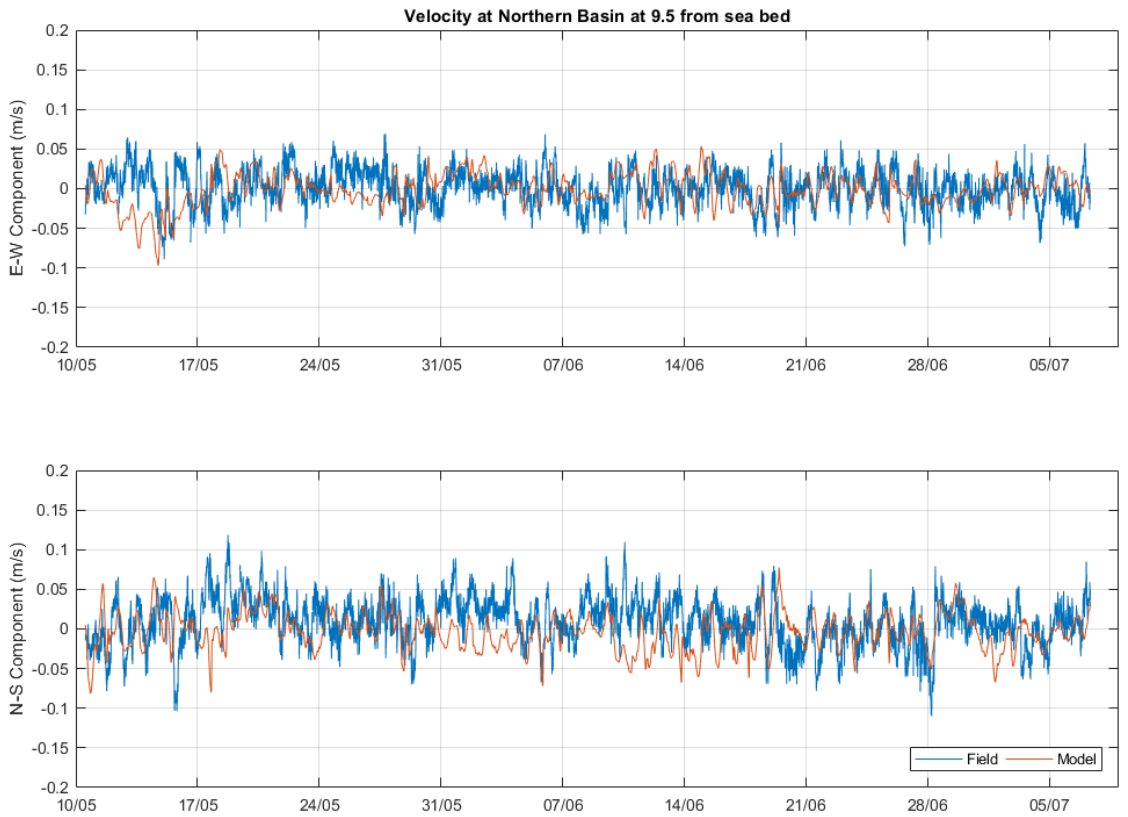

Figure 5-13 Comparison between simulated and measured ADCP velocities at 9.5m from the sea bed at Northern Basin for May to July 2006

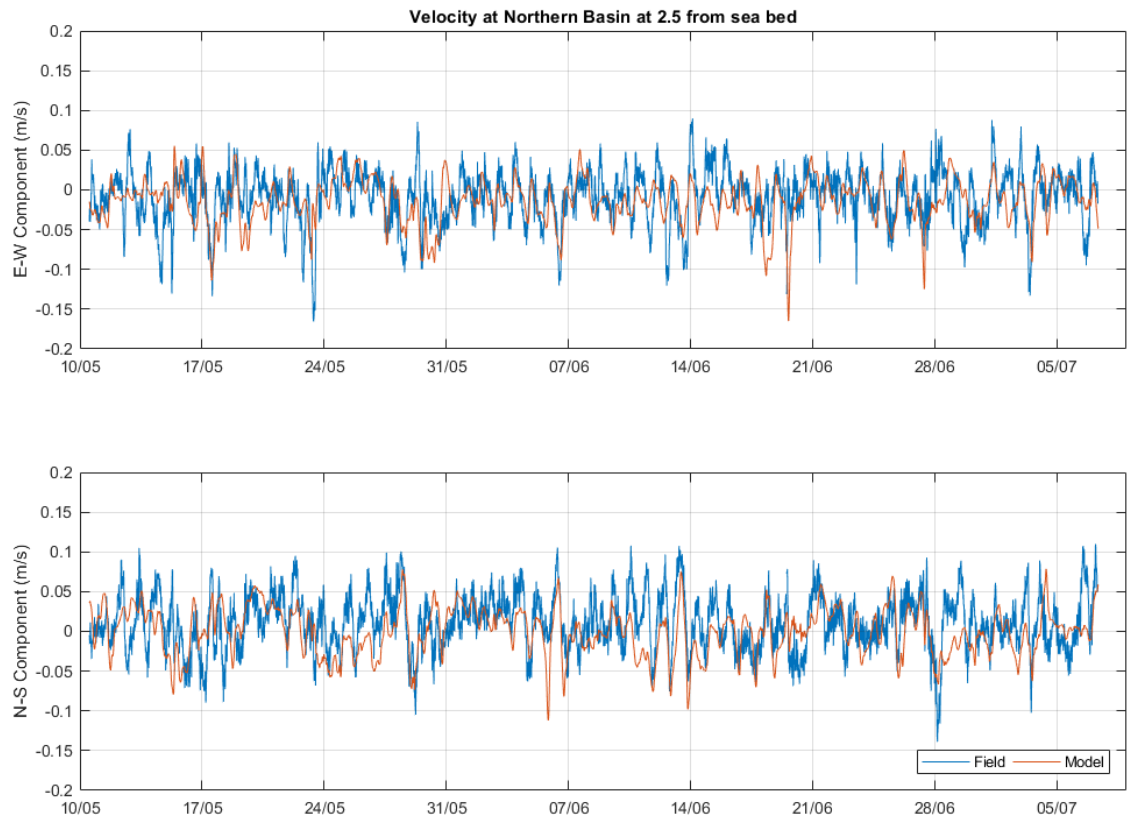

Figure 5-14 Comparison between simulated and measured ADCP velocities at 2.5m from the sea bed at Northern Basin for May to July 2006

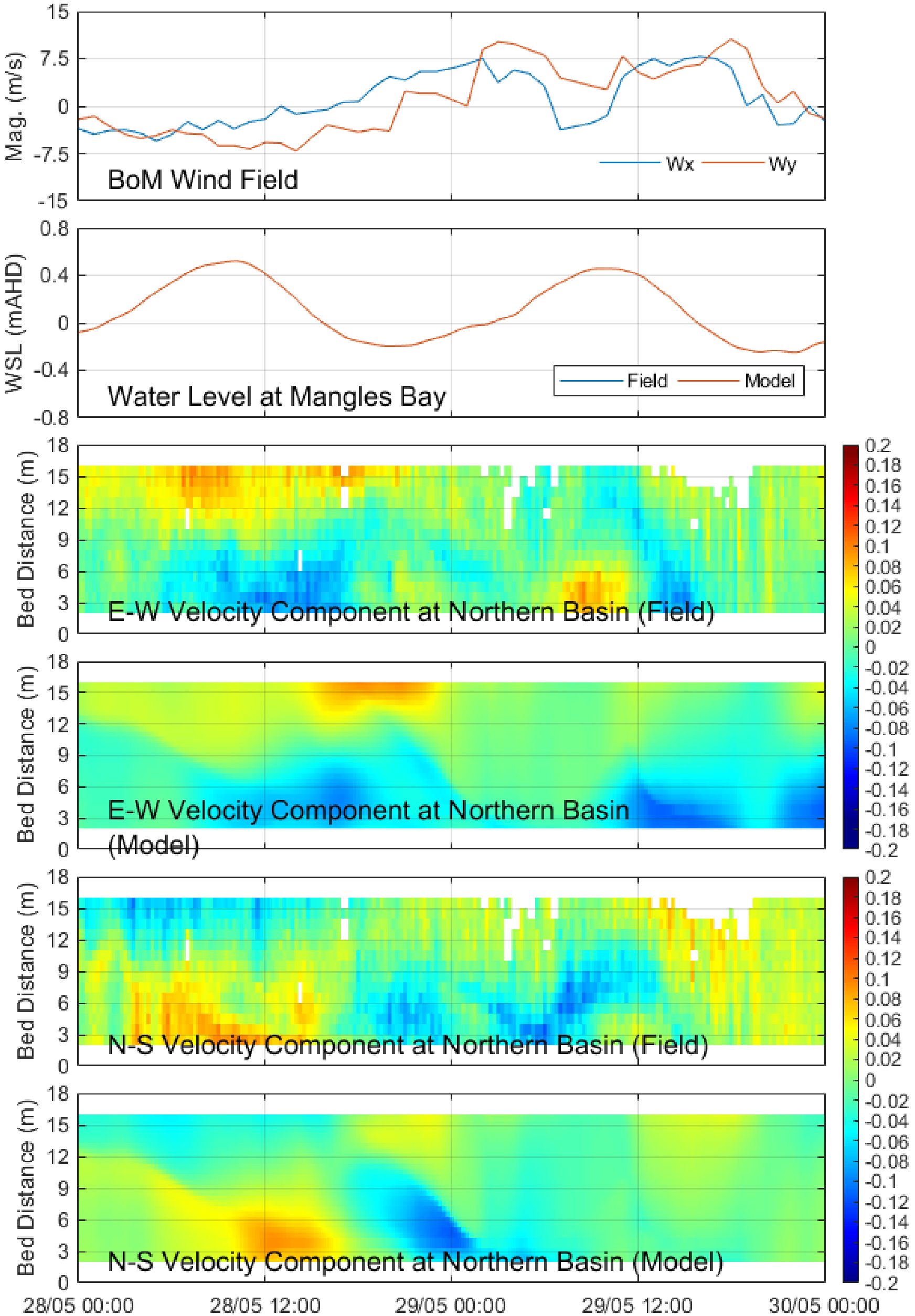

Figure 5-15 Response to field data and simulation results to a wind shifting from north to south-east (28 to 30 May 2006)

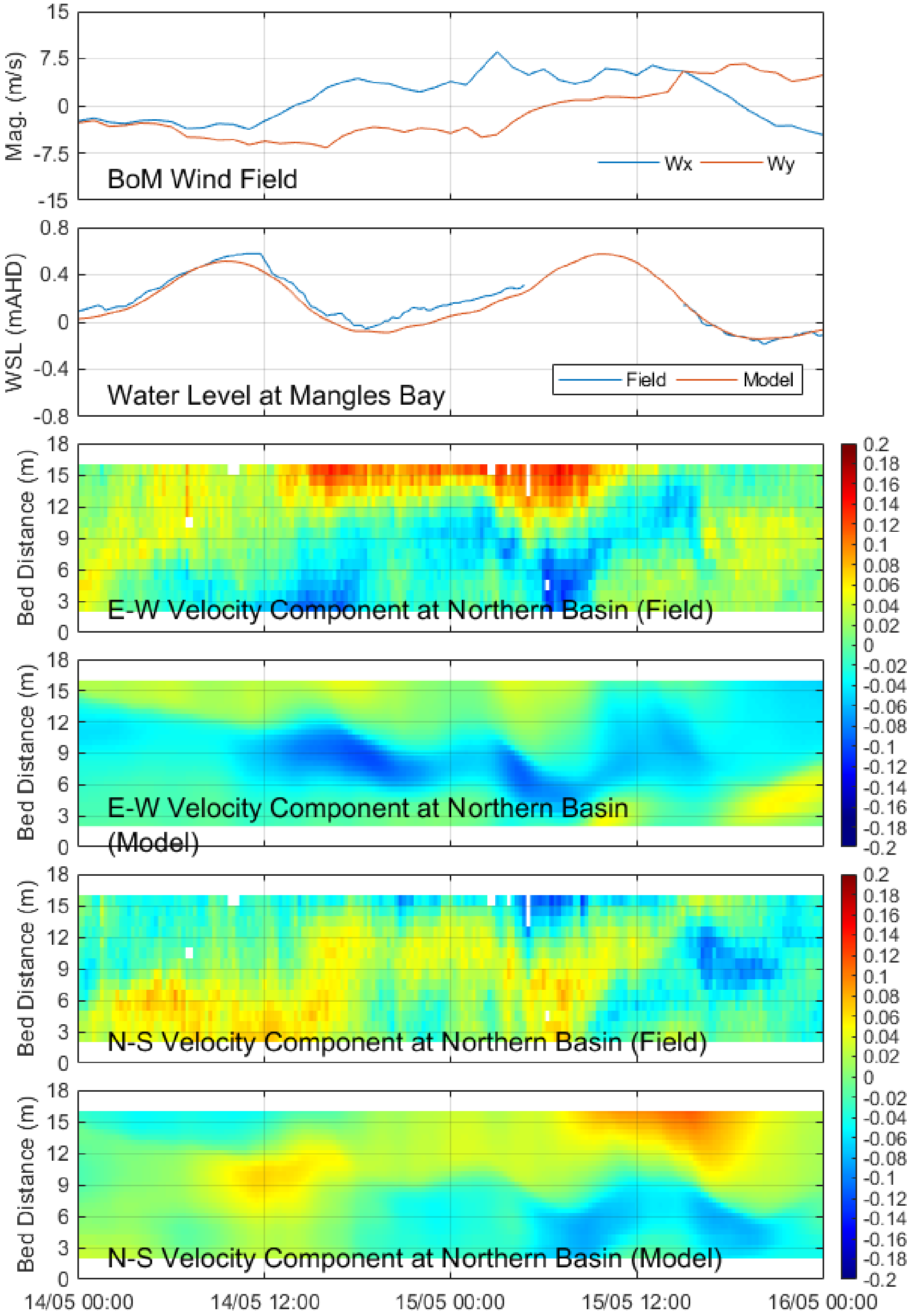

Figure 5-16 Response to field data and simulation results to a wind shifting from north to south-east (14 to 16 May 2006)

Table 5-5 Summary of model predictive skill statistics for currents at Spoil Grounds in Winter 2006

Height (m)	X-component IOA (-)	Y-component IOA (-)	X-component MAE (m/s)	Y-component MAE (m/s)	X-component RMSE (m/s)	Y-component RMSE (m/s)
1.6	0.50	0.78	0.017	0.019	0.021	0.024
2.1	0.53	0.79	0.017	0.020	0.022	0.025
2.6	0.57	0.80	0.018	0.021	0.022	0.027
3.1	0.63	0.80	0.018	0.022	0.022	0.028
3.6	0.68	0.80	0.018	0.023	0.022	0.029
4.1	0.72	0.81	0.019	0.024	0.023	0.031
4.6	0.75	0.81	0.020	0.025	0.025	0.032
5.1	0.76	0.81	0.021	0.026	0.027	0.034
CG	≥ 0.5	≥ 0.5	≤ 0.05	≤ 0.05	≤ 0.06	≤ 0.06

Table 5-6 Summary of model predictive skill statistics for currents at Northern Basin in Winter 2006

Height (m)	X-component IOA (-)	Y-component IOA (-)	X-component MAE (m/s)	Y-component MAE (m/s)	X-component RMSE (m/s)	Y-component RMSE (m/s)
2.5	0.61	0.64	0.027	0.030	0.035	0.037
3.5	0.62	0.64	0.028	0.031	0.035	0.038
4.5	0.64	0.63	0.026	0.031	0.033	0.039
5.5	0.65	0.61	0.025	0.032	0.031	0.040
6.5	0.64	0.58	0.022	0.032	0.029	0.040
7.5	0.62	0.55	0.021	0.031	0.027	0.039
8.5	0.57	0.52	0.021	0.030	0.027	0.038
9.5	0.49	0.48	0.023	0.029	0.029	0.037
10.5	0.44	0.45	0.024	0.029	0.030	0.036
11.5	0.48	0.44	0.024	0.030	0.031	0.037
12.5	0.55	0.47	0.025	0.031	0.031	0.039
13.5	0.61	0.51	0.026	0.032	0.033	0.041
14.5	0.64	0.55	0.028	0.034	0.035	0.043
15.5	0.65	0.59	0.030	0.035	0.038	0.045
CG	≥ 0.5	≥ 0.5	≤ 0.05	≤ 0.05	≤ 0.06	≤ 0.06

5.2.2.2 January to March 2007

The measured and simulated colour contours and time series velocities comparisons for the period of January to March 2007 (transition from summer to autumn) at Spoil Grounds and Northern Basin are shown in Figure 5-17 to Figure 5-24. Again, the same comparisons are shown over shorter time intervals in Appendix E.

At Spoil Grounds, measured and simulated velocities were generally low (< 0.10 m/s), with velocity components again increasing up to 0.15 m/s during stronger wind events. An example of how the model captured the different water motion as subjected to different wind conditions can be seen in Figure 5-21. The period depicted (27 February to 11 March) starts with calm wind conditions associated with a West Coast trough (see Section 2.2.2.1) followed by the passage of low pressure system approaching from the north and subsequent establishment of a land-sea breeze pattern. A high-pressure system swept the west Australian coast at the end of the period. Note the period corresponded with formation and passage of TCs George and Jacob across the north west of Australia. The model replicated the associated water response to the wind forcing remarkably well, showing velocities to the south under the northerly winds (low-pressure system) and velocities to the north under the high-pressure-system-induced southerly winds. During the land-sea breeze period, the model predicted both intensity of the surface layer and near bed flow as the system intensity diminished.

At Northern Basin, measured and simulated velocities also presented a three-layered structure, similarly to the winter period. Corresponding simulated velocities in the surface layer were up to 0.20 m/s and lower near the bottom, at up to approximately 0.08 m/s. The representation of water velocities at the station under the different wind patterns between 27 February and 11 March is illustrated in Figure 5-26. Again, the model reproduced the features of the measured velocity components, however, the model response during the land-sea breeze patterns were generally more accentuated in comparison to the measurements. The predictions were nonetheless in very good agreement with the field data.

The evaluation of model error for the measurement period is presented in Table 5-7 and Table 5-8 for Spoil Grounds and Northern Basin, respectively. Again, velocity IOAs were generally well above 0.5 (with exception to a few instances associated again with low velocity components at high noise to signal ratios). MAE was similar to winter measurements, between 0.02 and 0.03 m/s for both Spoil Grounds and Northern Basin. RMSE was between 0.03 and 0.04 m/s for both locations. As for winter simulations, these results were similar to other modelling investigations compared to the same data set (CWR 2009) and within the model ranges agreed at project inception (Table 5-4).

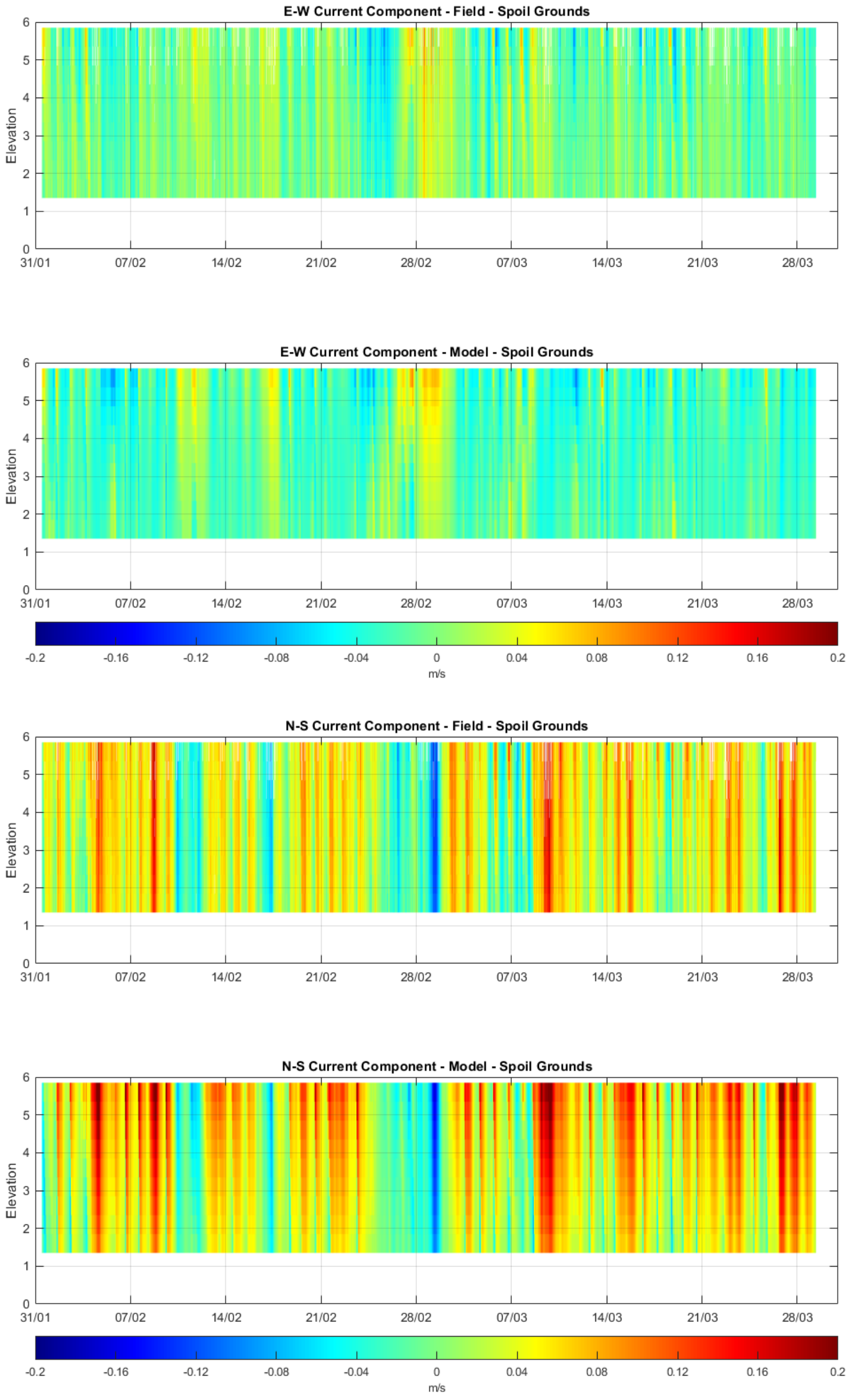

Figure 5-17 Comparisons between simulated velocities and ADCP measurements at Spoil Grounds for February to March 2007

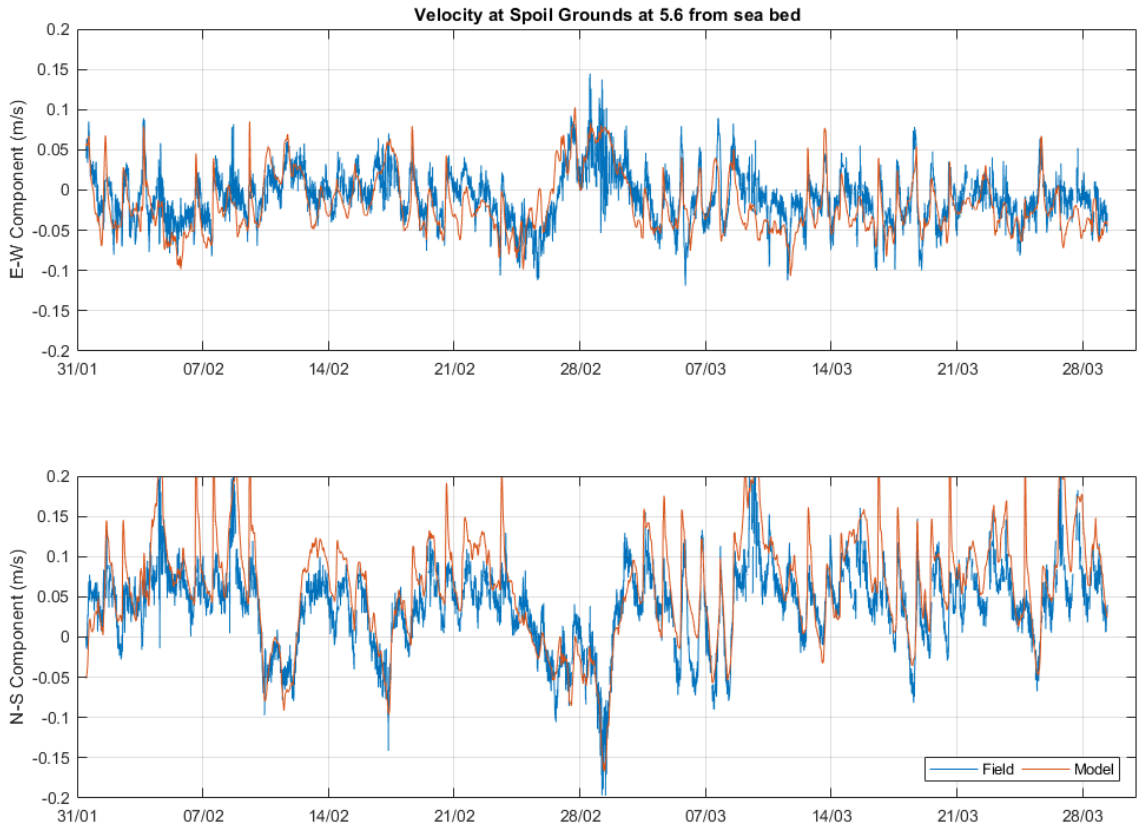

Figure 5-18 Comparison between simulated and measured ADCP velocities at 5.1m from sea bed at Spoil Grounds for February to March 2007

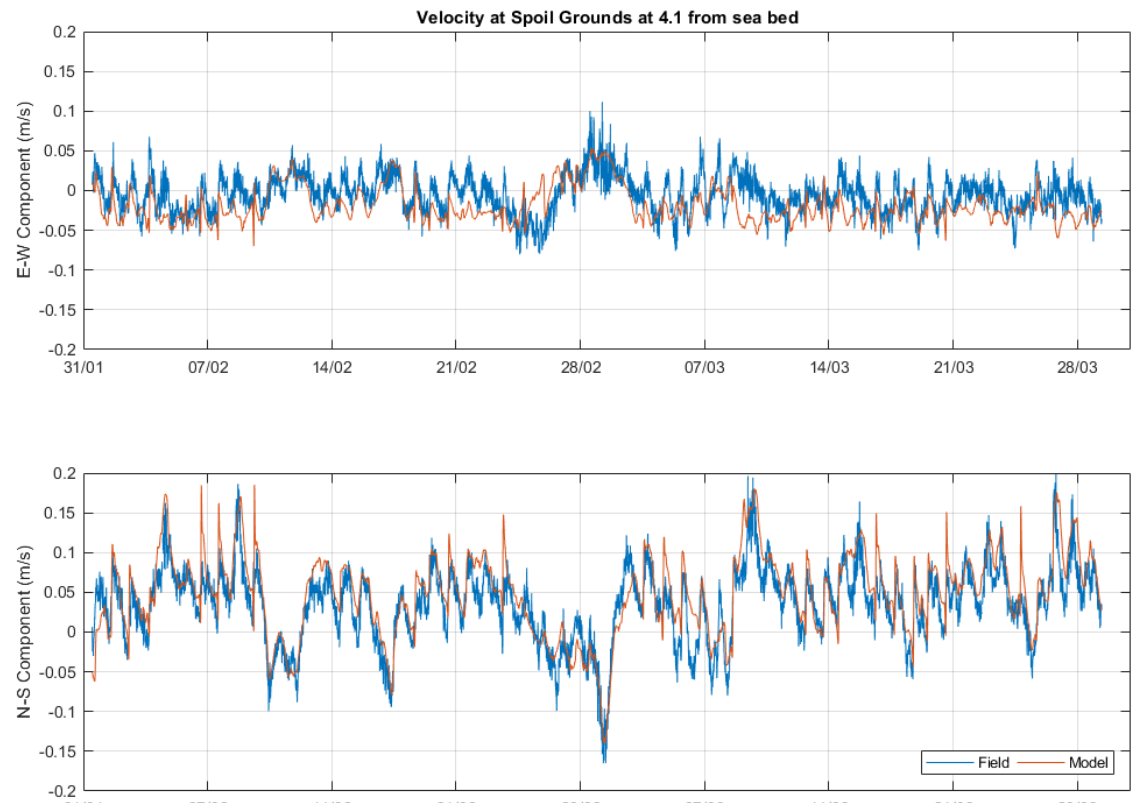

Figure 5-19 Comparison between simulated and measured ADCP velocities at 3.6m from sea bed at Spoil Grounds for February to March 2007

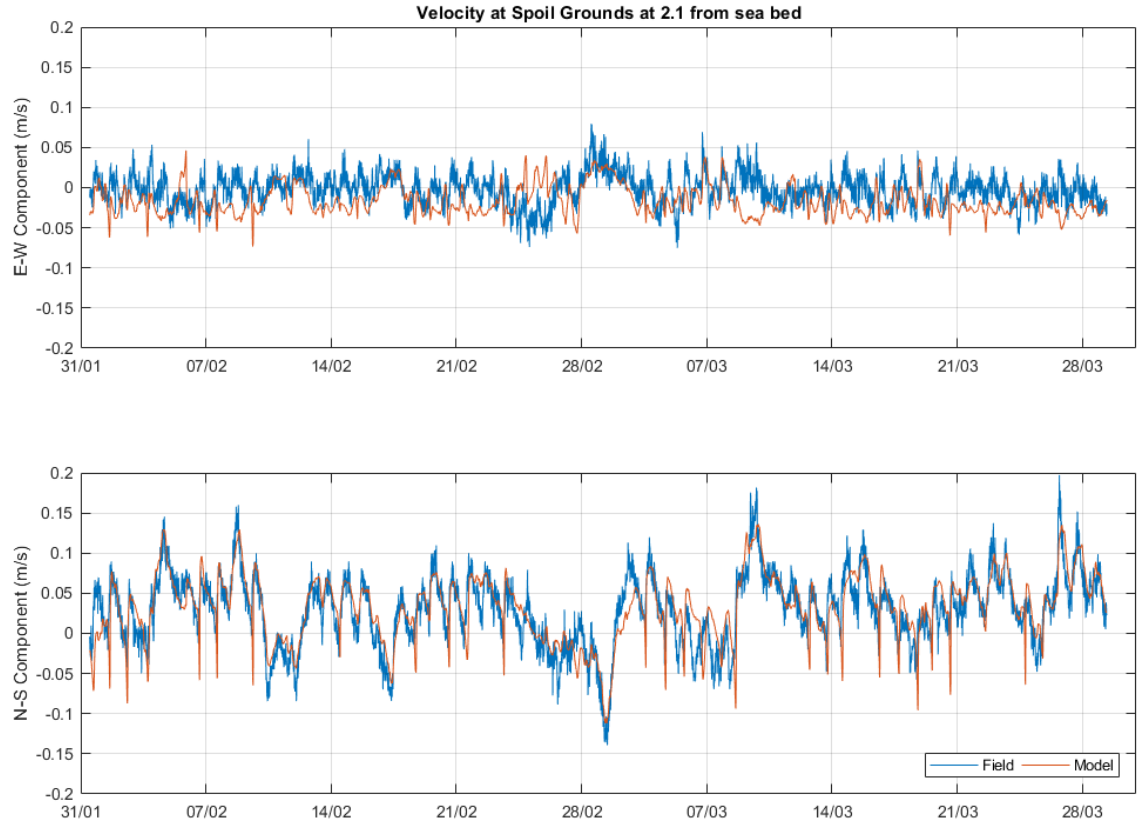

Figure 5-20 Comparison between simulated and measured ADCP velocities at 1.6m from sea bed at Spoil Grounds for February to March 2007

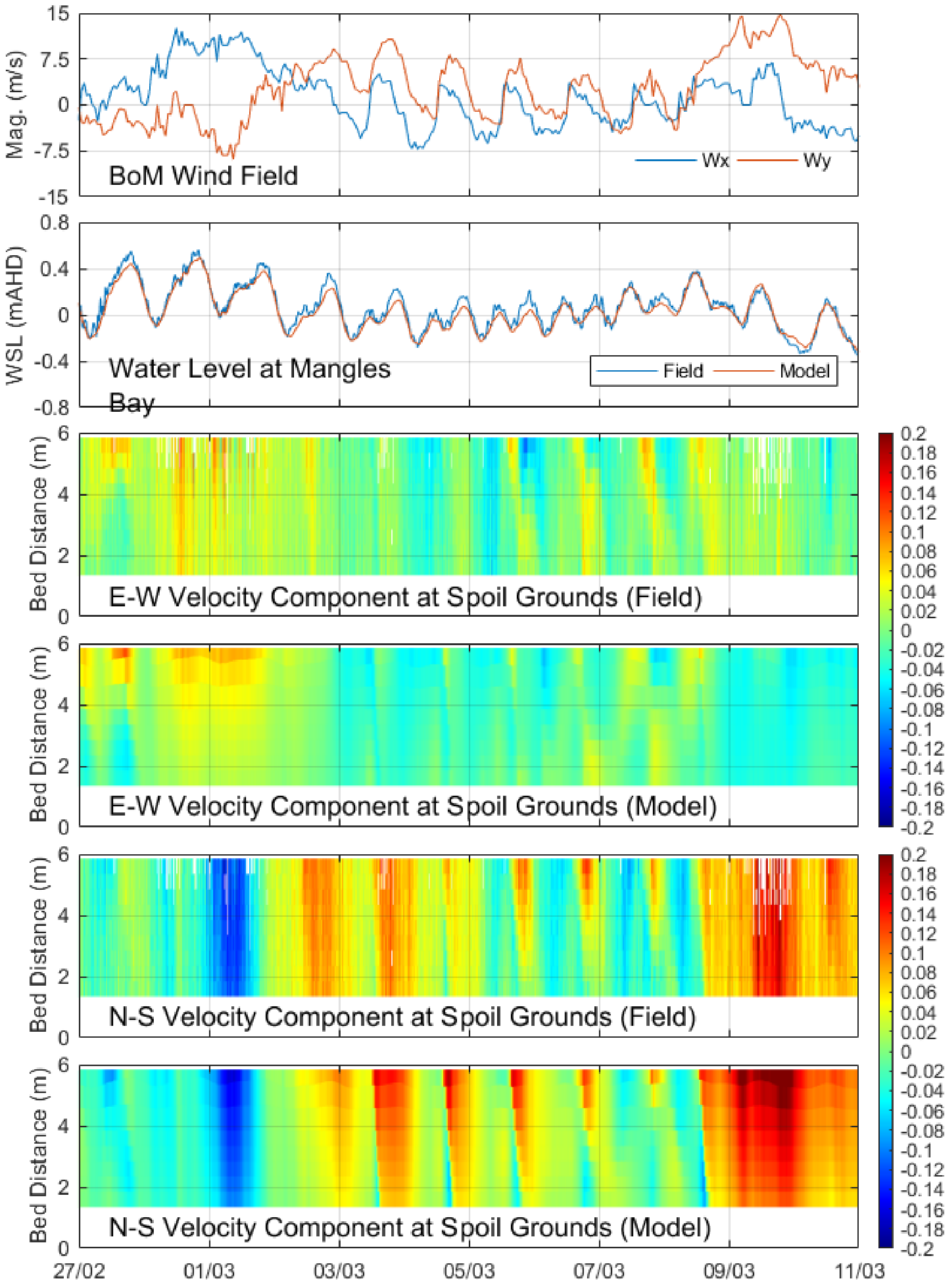

Figure 5-21 Response to field data and simulation results to different wind regimes at Spoil Grounds (27 February to 11 March 2007)