環臺200公尺解析度潮汐模式準確度探討

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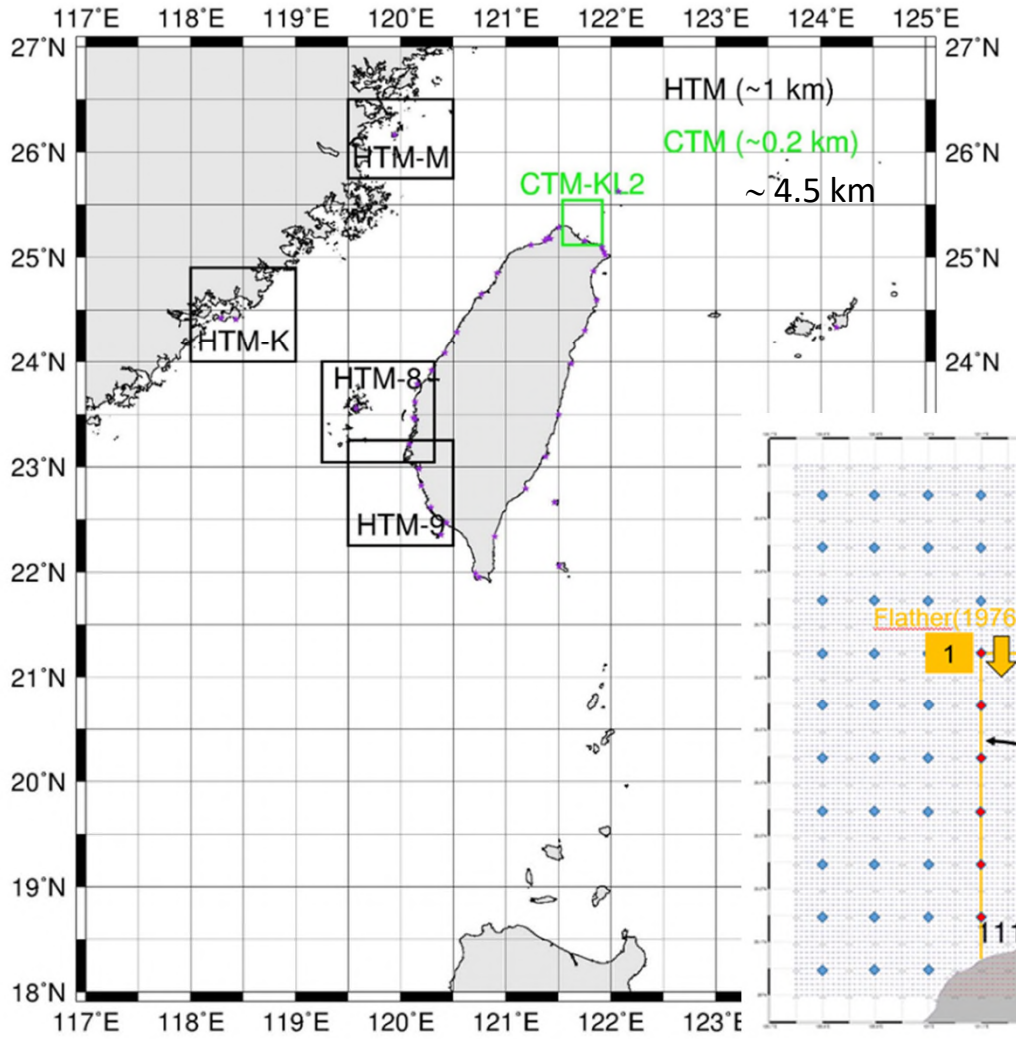
2025/09/04

108年MOI.18v1潮位模式



1. 巢狀網格

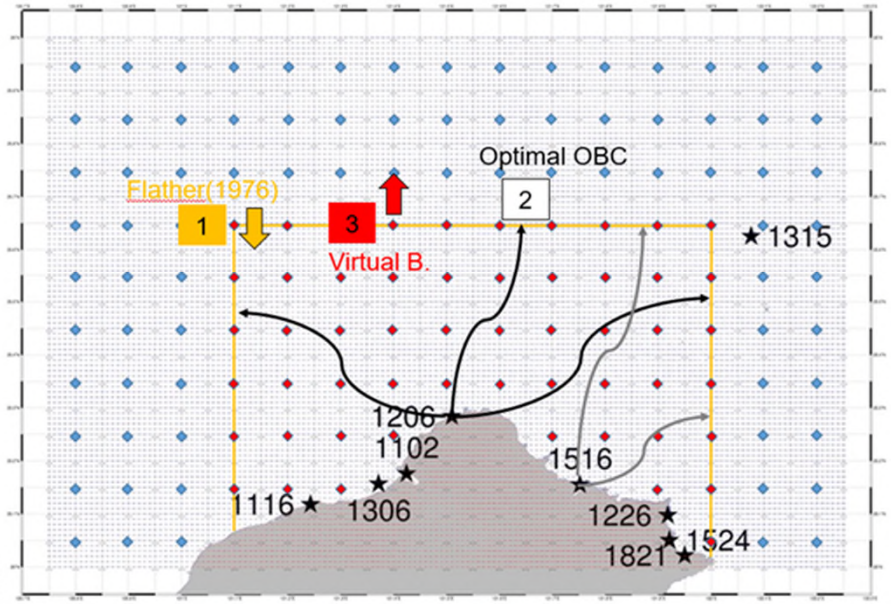
Flather and Proctor (1983),

$$u = u_G \pm c\,(\eta_G - \eta)/h,$$

where subscript G denotes variables from Global NCOM, and c is the barotropic wave phase speed: $c = \sqrt{gh}$, with g being the gravitational constant and h the water depth. On the western/southern boundary the positive sign is applied; on the eastern/northern boundary the negative sign is applied

2. 優化邊界

$$f(x,y) = \left[\sum_{i=1}^{N} w(d_i) z_i\right] / \left[\sum_{i=1}^{N} w(d_i)\right]$$

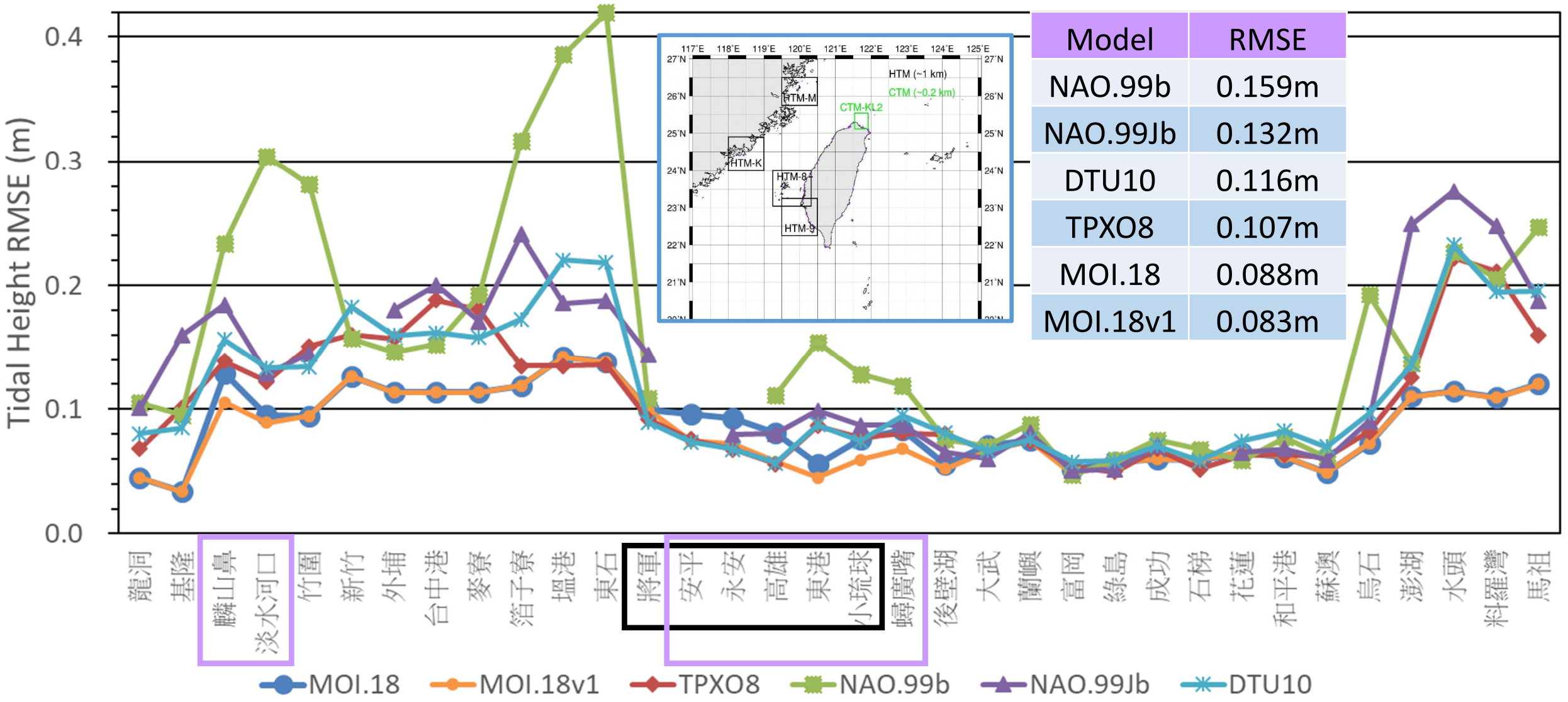


3. 雙向回饋（資料同化）

Ko and Wang (2014)

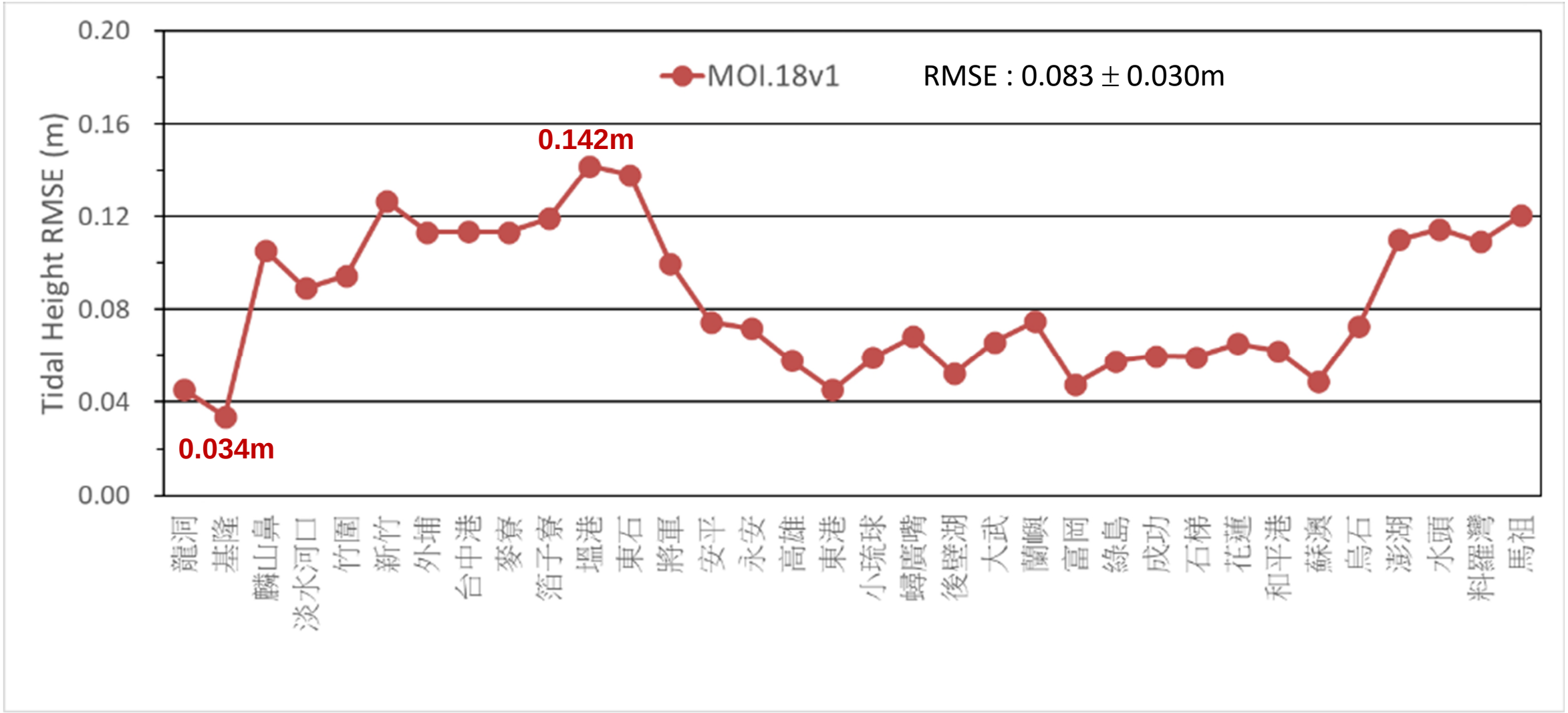
$$\eta_{update} = \eta_{model} + \alpha\left(\eta_{analysis} - \eta_{model}\right)$$

η	: Tidal height
α	: Weighting function (0 – 1)
model	: Model prediction
analysis	: High resolution model
update	: Update model prediction

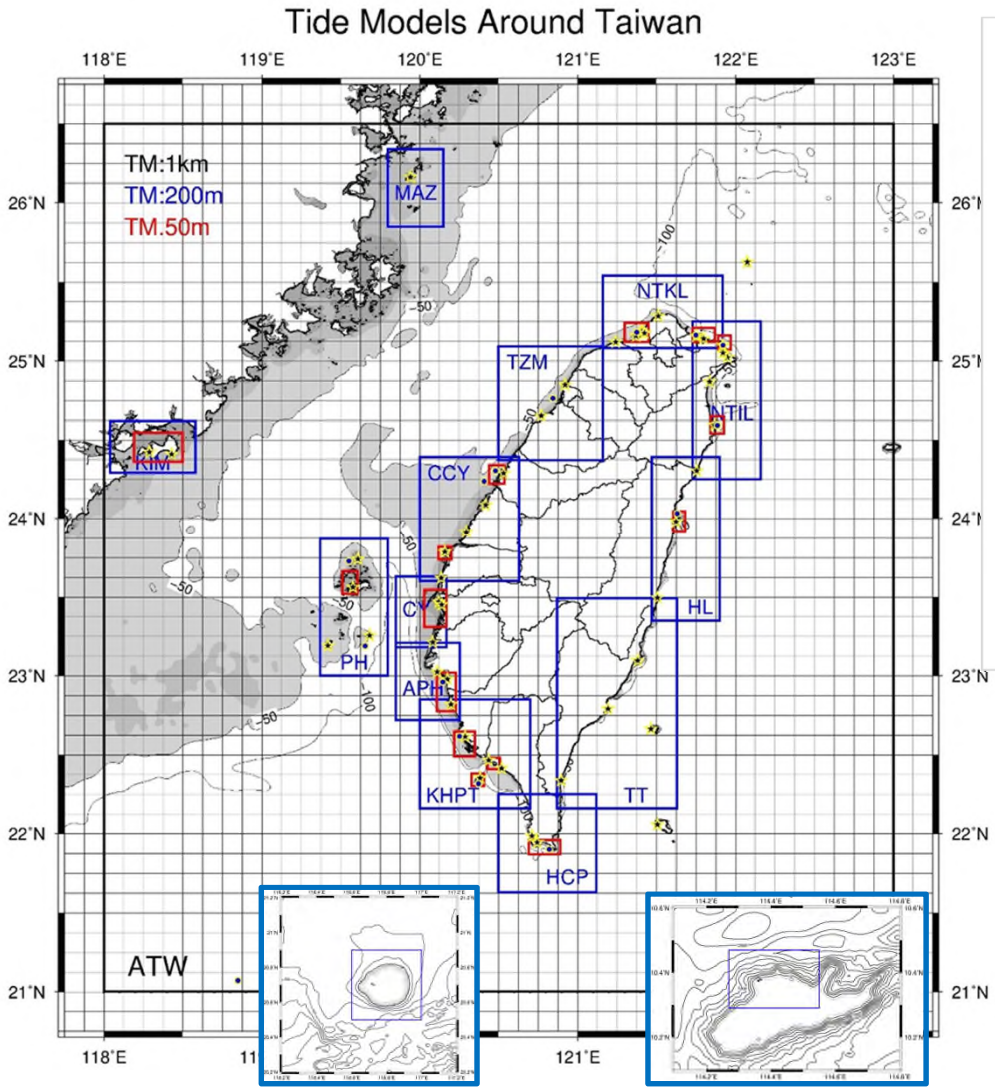


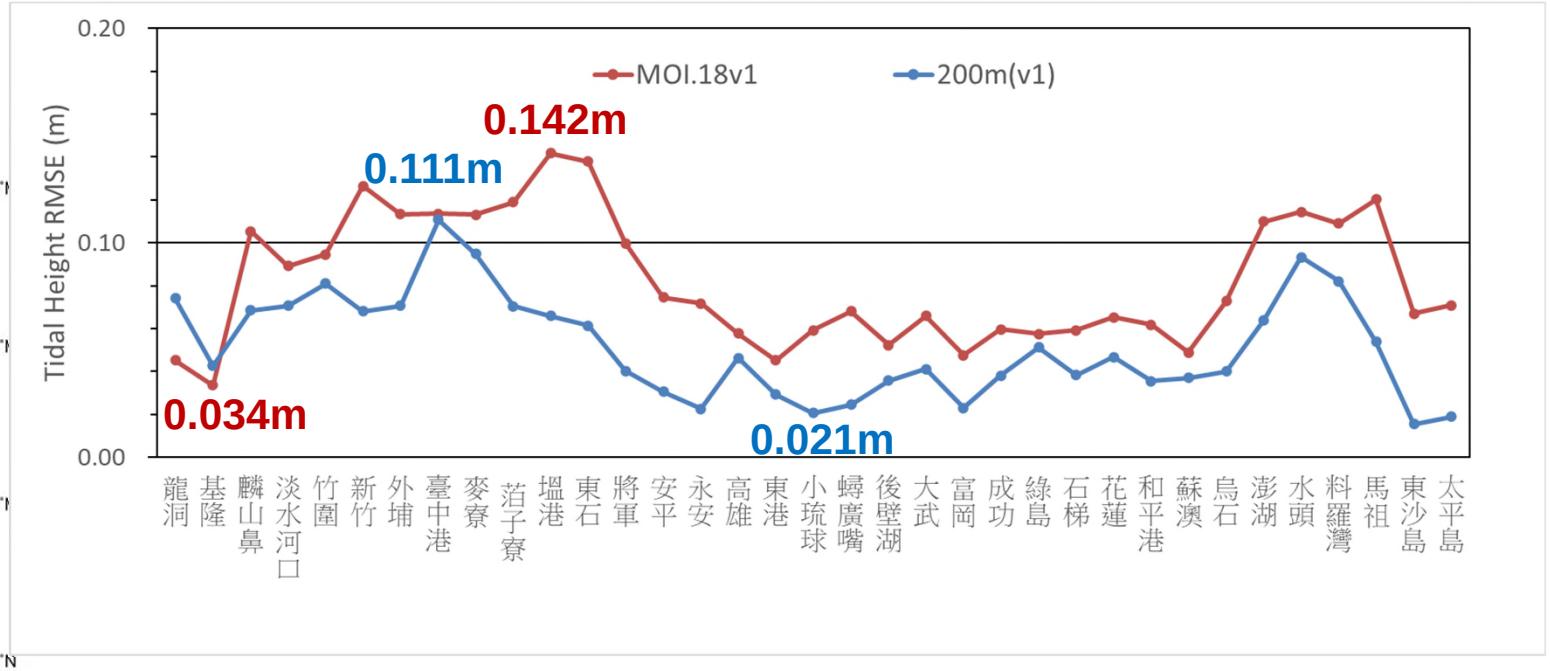
Model	RMSE
NAO.99b	0.159m
NAO.99Jb	0.132m
DTU10	0.116m
TPXO8	0.107m
MOI.18	0.088m
MOI.18v1	0.083m

108年MOI.18v1潮位模式



113年200m潮位模式



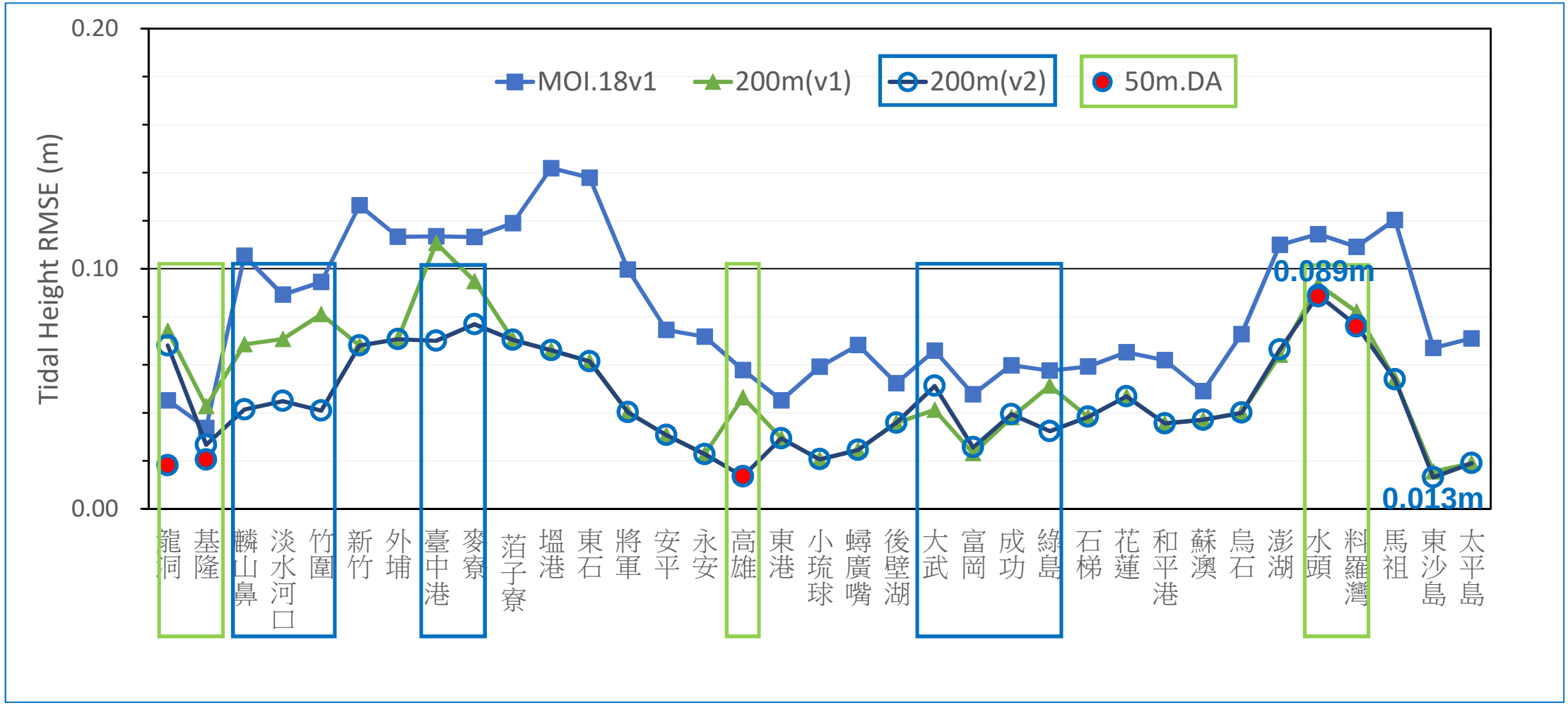


MOI.18v1：
RMSE：0.083 ± 0.030m

精進 →

200m (v1)
RMSE：0.054 ± 0.023m

114年200m潮位模式



MOI.18v1：
RMSE：0.083 ± 0.030m

精進

200m(v1)
RMSE：0.054 ± 0.023m

精進

200m(v2)+50mDA
RMSE：0.044 ± 0.021m

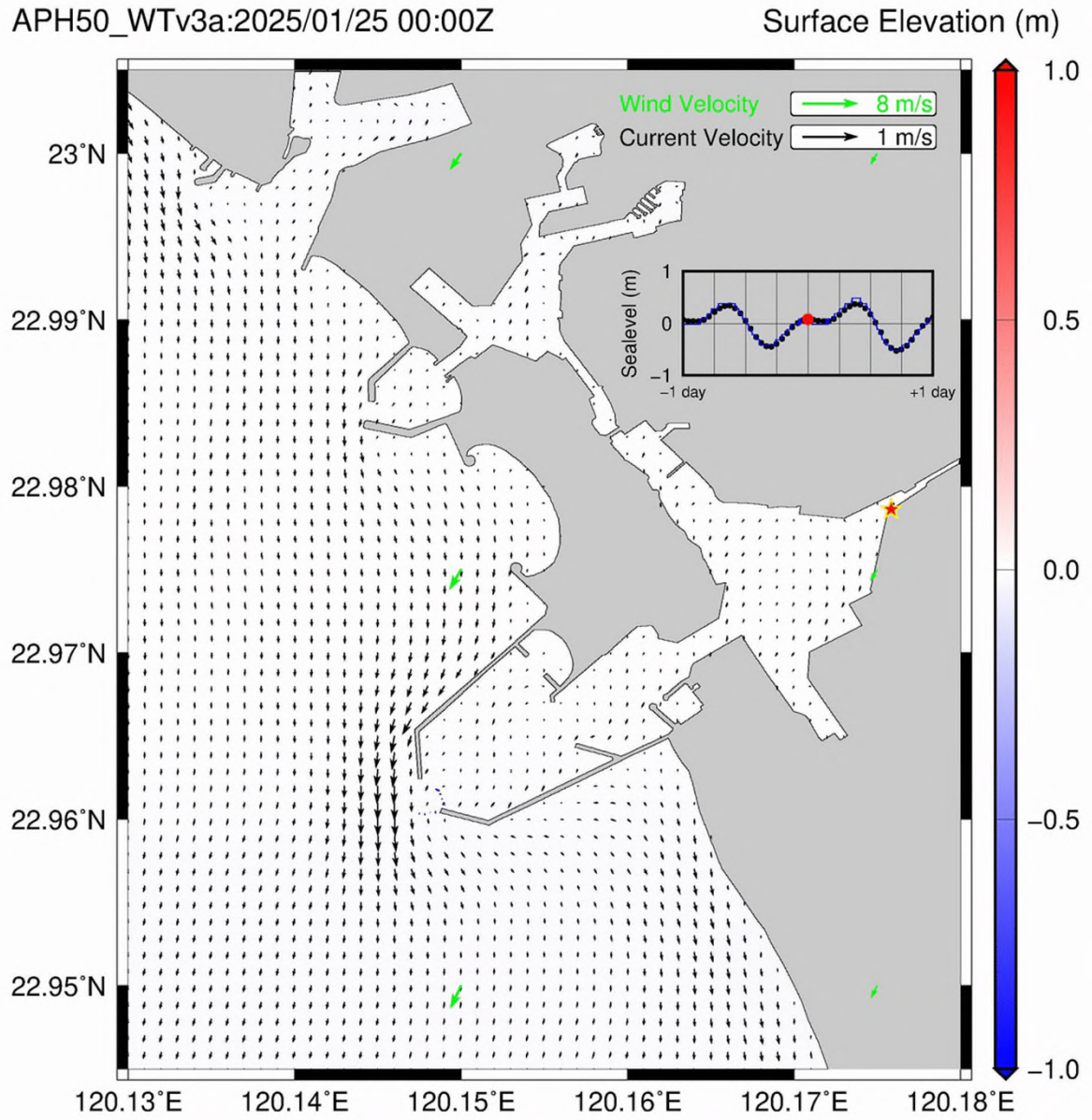
潮位模式誤差的探討

	振幅比值	相位差值
M2	1.0000	0.00
S2	1.0002	0.01
N2	1.0000	0.01
K2	1.0006	-0.04
K1	1.0000	0.02
O1	1.0000	0.00
P1	1.0010	-0.02
Q1	1.0018	-0.02
M4	0.9913	-0.19
MS4	1.0000	0.68
MN4	0.9854	-0.97
MM	1.0253	-4.14
MF	1.0208	-2.21
H2	1.0671	0.43
J1	0.9944	-0.04
NO1	0.9968	0.04
OO1	0.9911	-0.04
2N2	0.9972	0.03
MU2	1.0000	-0.02
NU2	1.0011	0.04
L2	0.9988	0.02
T2	1.0026	0.36
MSF	1.0744	-35.86
MSM	1.0000	1.09
SSA	1.0018	0.00
SA	1.0011	-0.18

觀測(振幅、相位)		模式(振幅、相位)	
1.8078	116.11	1.8078	116.11
0.5341	160.12	0.5340	160.11
0.3327	96.58	0.3327	96.57
0.1625	157.55	0.1624	157.59
0.3465	162.09	0.3465	162.07
0.2915	124.29	0.2915	124.29
0.1026	159.29	0.1025	159.31
0.0550	105.91	0.0549	105.93
0.0568	231.53	0.0573	231.72
0.0406	277.54	0.0406	276.86
0.0202	211.58	0.0205	212.55
0.0081	171.03	0.0079	175.17
0.0049	92.10	0.0048	94.31
0.0700	19.47	0.0656	19.04
0.0178	193.62	0.0179	193.66
0.0313	198.90	0.0314	198.86
0.0111	240.93	0.0112	240.97
0.0356	70.83	0.0357	70.80
0.0763	220.40	0.0763	220.42
0.0894	92.50	0.0893	92.46
0.0867	142.19	0.0868	142.17
0.0391	133.70	0.0390	133.34
0.0130	287.20	0.0121	323.06
0.0013	273.57	0.0013	272.48
0.0568	63.20	0.0567	63.20
0.1824	318.15	0.1822	318.33

M2	1.8078	116.11
S2	0.5341	160.12
K1	0.3465	162.09
N2	0.3327	96.58
O1	0.2915	124.29
SA	0.1824	318.15
K2	0.1625	157.55
P1	0.1026	159.29
NU2	0.0894	92.50
L2	0.0867	142.19
MU2	0.0763	220.40
M4	0.0568	231.53
SSA	0.0568	63.20
Q1	0.0550	105.91
MS4	0.0406	277.54
T2	0.0391	133.70
2N2	0.0356	70.83
NO1	0.0313	198.90
MN4	0.0202	211.58
J1	0.0178	193.62
MSF	0.0130	287.20
OO1	0.0111	240.93
MM	0.0081	171.03
S1	0.0055	322.52
MF	0.0049	92.10
MSM	0.0013	273.57

M2	1.8078	116.11
S2	0.5341	160.12
K1	0.3465	162.09
N2	0.3327	96.58
O1	0.2915	124.29
SA	0.1824	318.15
K2	0.1625	157.55
P1	0.1026	159.29
NU2	0.0894	92.50
L2	0.0867	142.19
MU2	0.0763	220.40
H2	0.0700	19.47
M4	0.0568	231.53
SSA	0.0568	63.20
Q1	0.0550	105.91
LDA2	0.0433	135.62
MS4	0.0406	277.54
M6	0.0395	17.07
T2	0.0391	133.70
2MS6	0.0362	64.40
2N2	0.0356	70.83
MO3	0.0328	224.96
NO1	0.0313	198.90
H1	0.0311	189.62
MK3	0.0256	266.10
EPS2	0.0230	188.46
2MN6	0.0212	353.18
MN4	0.0202	211.58


APH50_WTv3a:2025/01/25 00:00Z
Surface Elevation (m)
Wind Velocity
8 m/s
Current Velocity
1 m/s
Sealevel (m)
1
0
−1
−1 day
+1 day
23°N
22.99°N
22.98°N
22.97°N
22.96°N
22.95°N
120.13°E
120.14°E
120.15°E
120.16°E
120.17°E
120.18°E
1.0
0.5
0.0
−0.5
−1.0

Thank you for your attention!