CLIK hands-on (part II):

Multi-Model Prediction

(http://clik.apcc21.org)

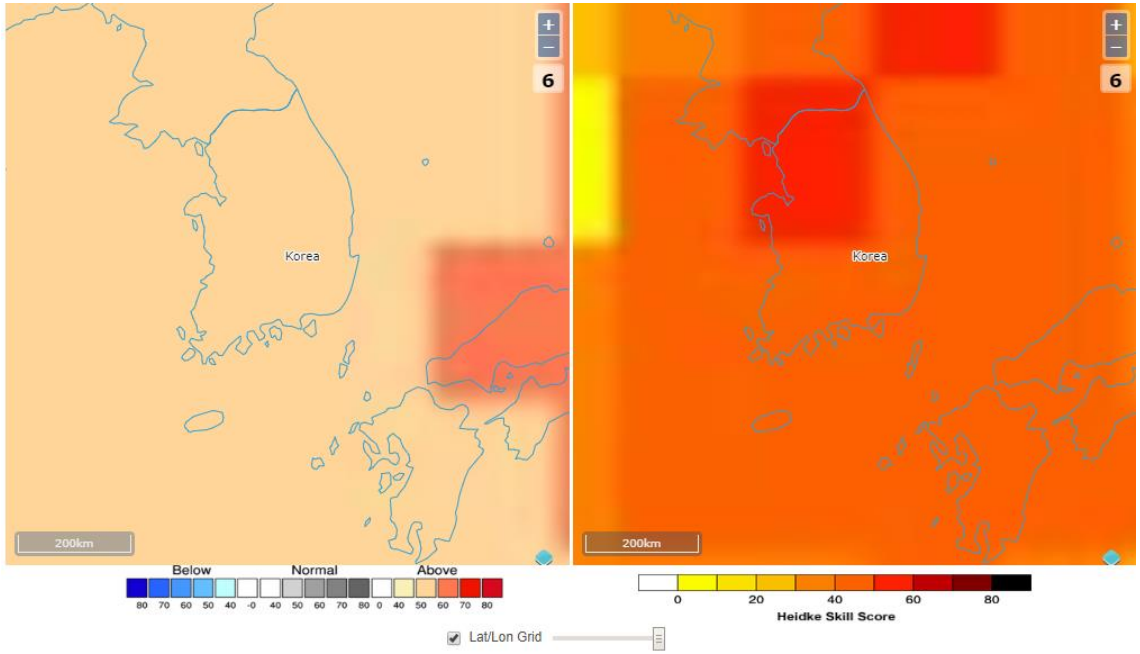
Daeun Jeong

28 August 2019

APCC APEC CLIMATE CENTER

Temperature over Busan for ASO 2019?

Final output today!!!

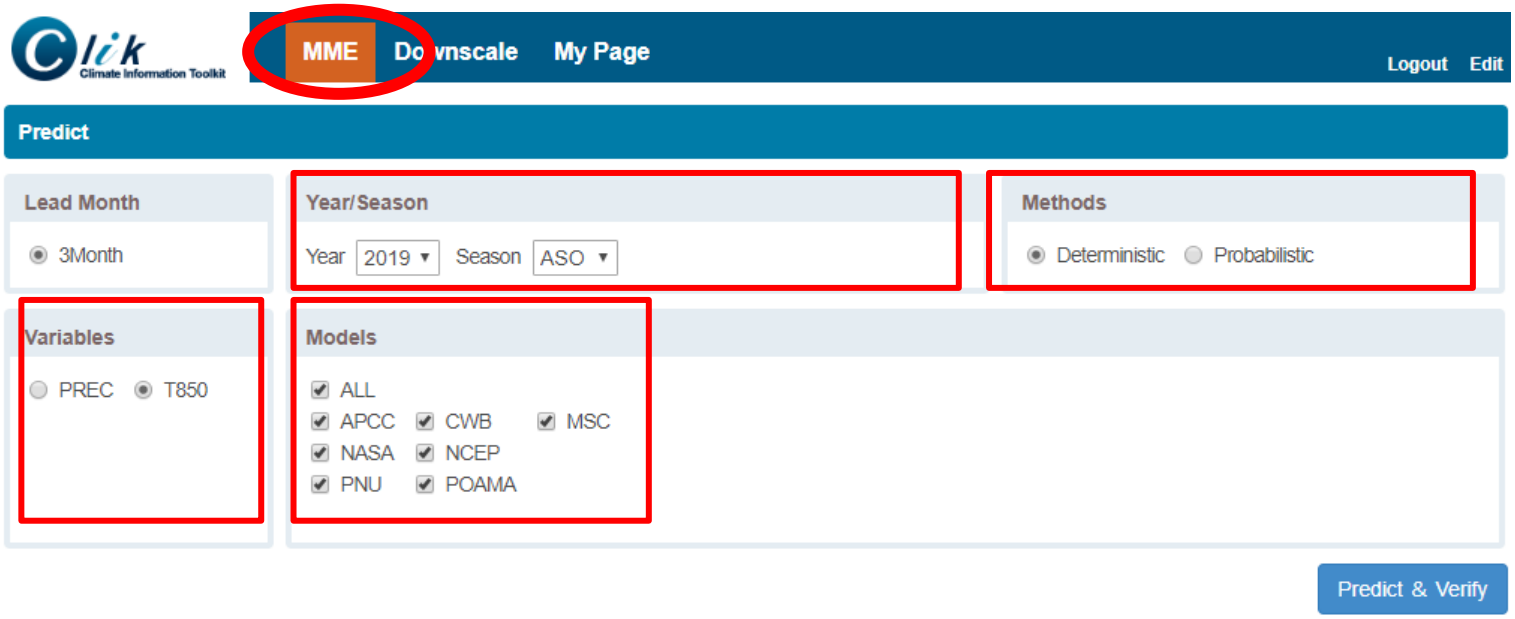


Probability for temperature at 850 hPa for Busan

AN	52.257%
NN	25.664%
BN	14.097%
HSS	40~50

1. Deterministic MME

1-1. Customize your own prediction



① When

: 3-month lead prediction data is updated every month.

② Methods

: 1 deterministic (SCM) and 1 probabilistic (GAUS) MME methods

③ Variables

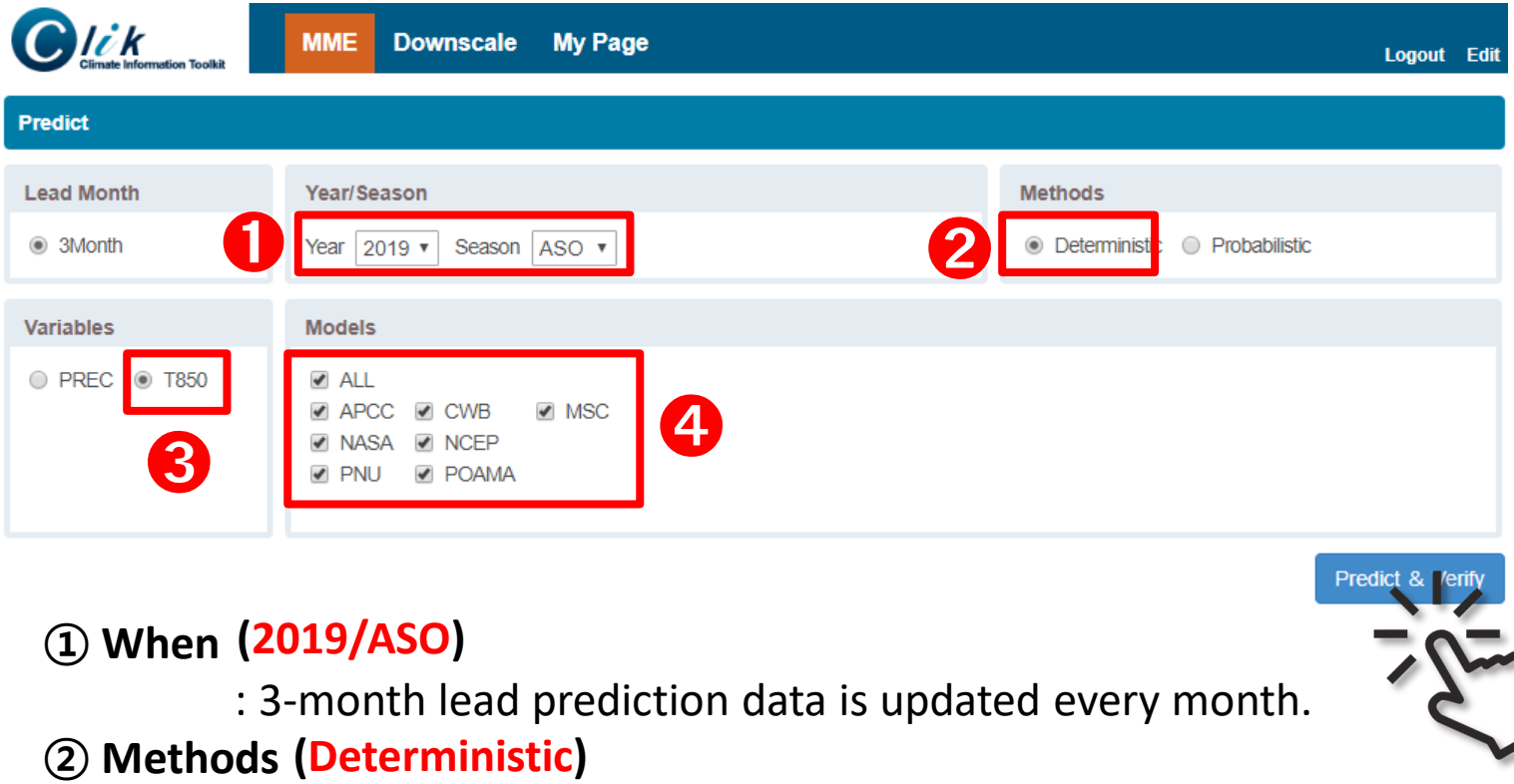
: the target variable

④ Models

: GCM models for a MME prediction

1. Deterministic MME

1-1. Customize your own prediction



① **When** (**2019/ASO**)

: 3-month lead prediction data is updated every month.

② **Methods** (**Deterministic**)

: 1 deterministic (SCM) and 1 probabilistic (GAUS) MME methods

③ **Variables** (**T850**)

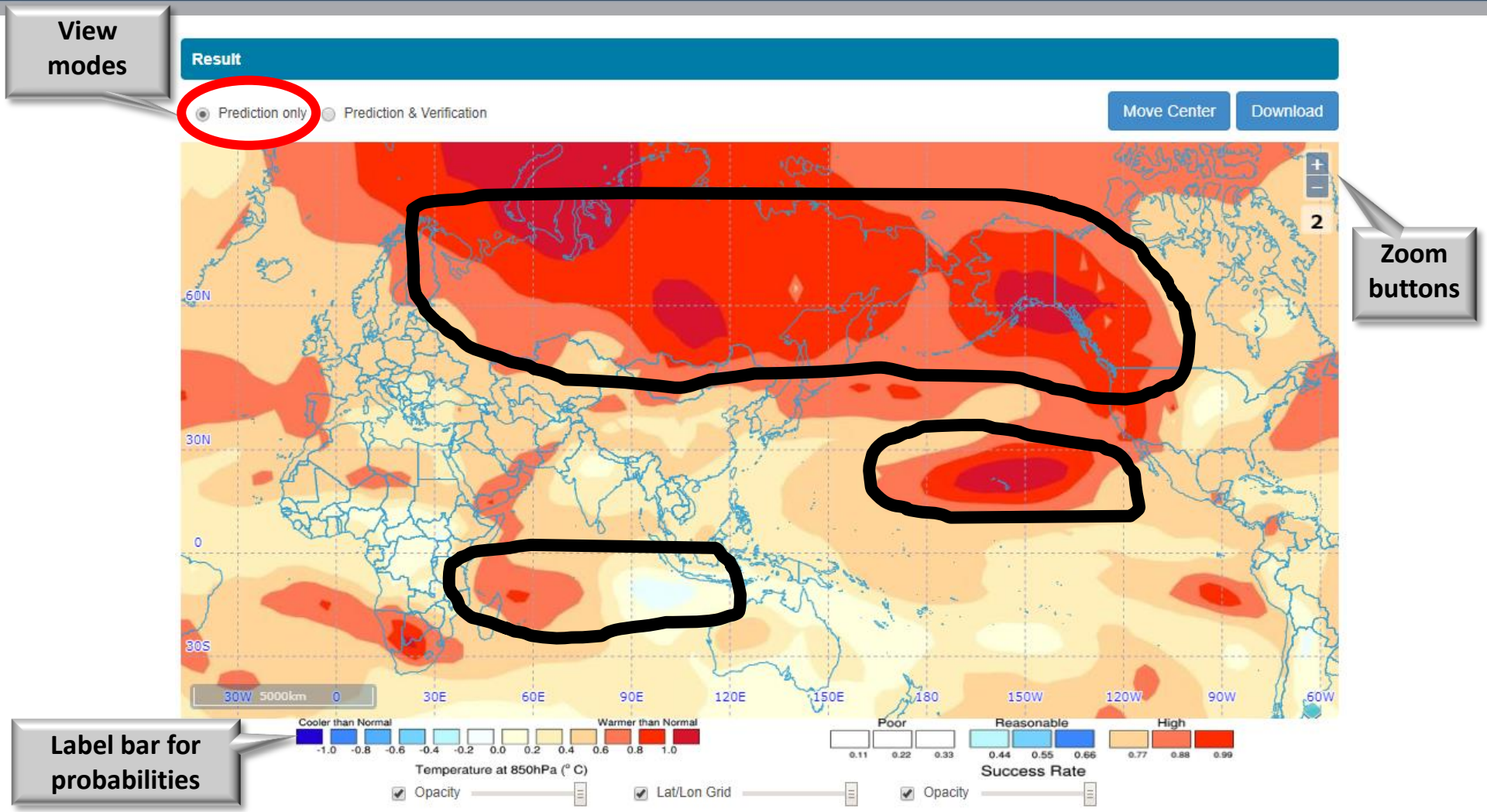
: the target variable

④ **Models** (**ALL**)

: GCM models for a MME prediction

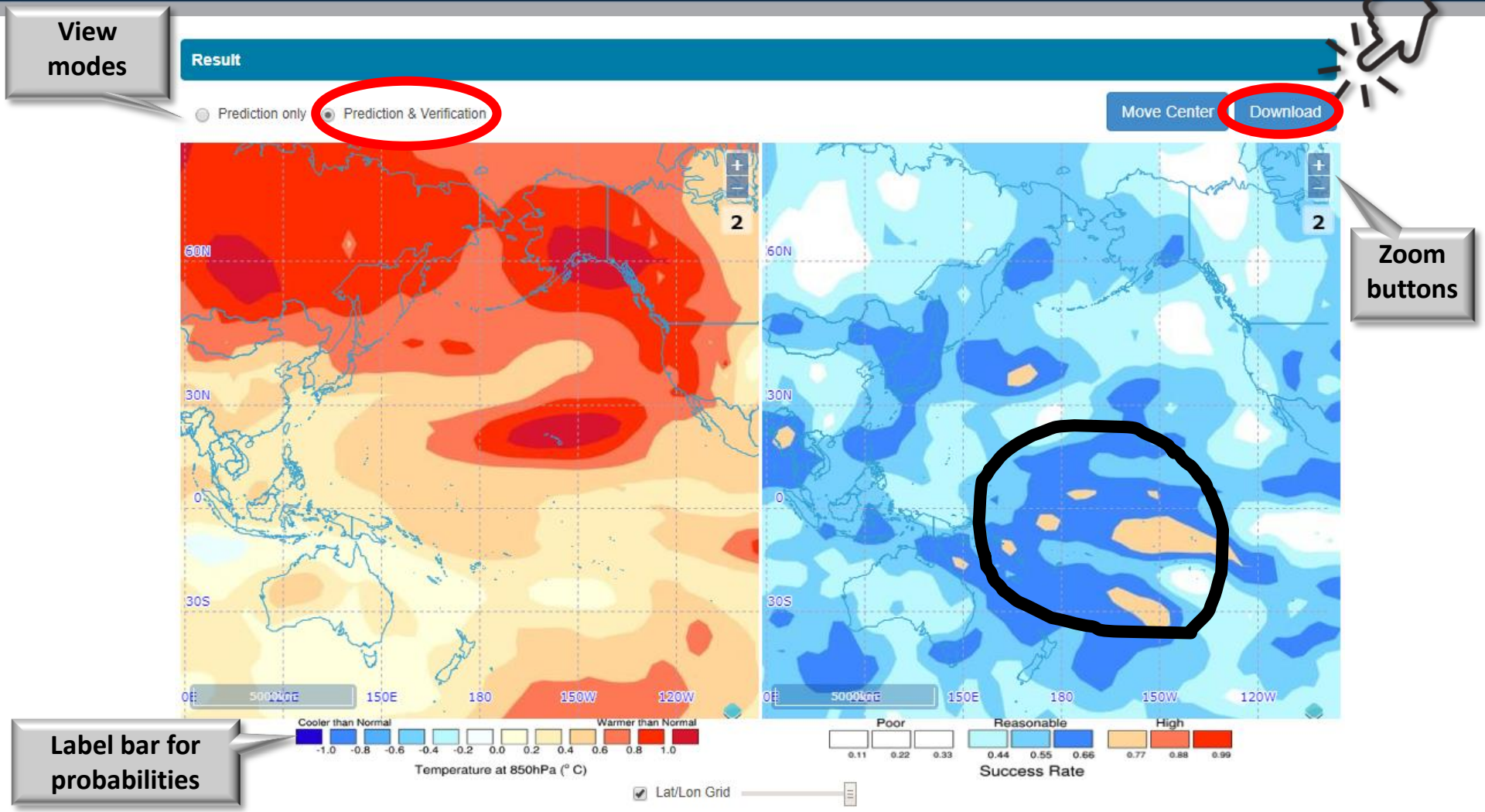
1. Deterministic MME

1-2. Read the map



1. Deterministic MME

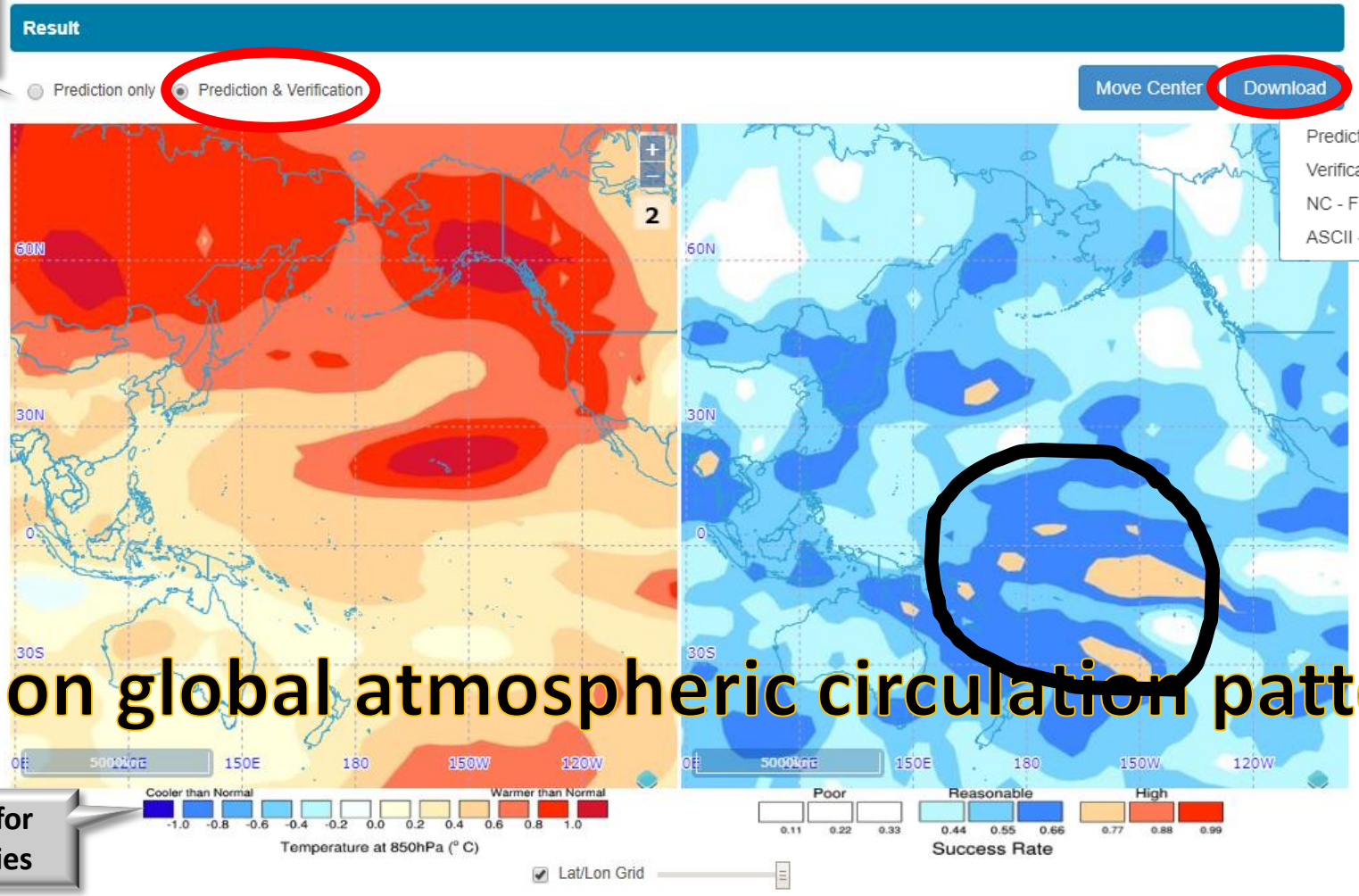
1-2. Read the map



1. Deterministic MME

1-2. Read the map

View modes



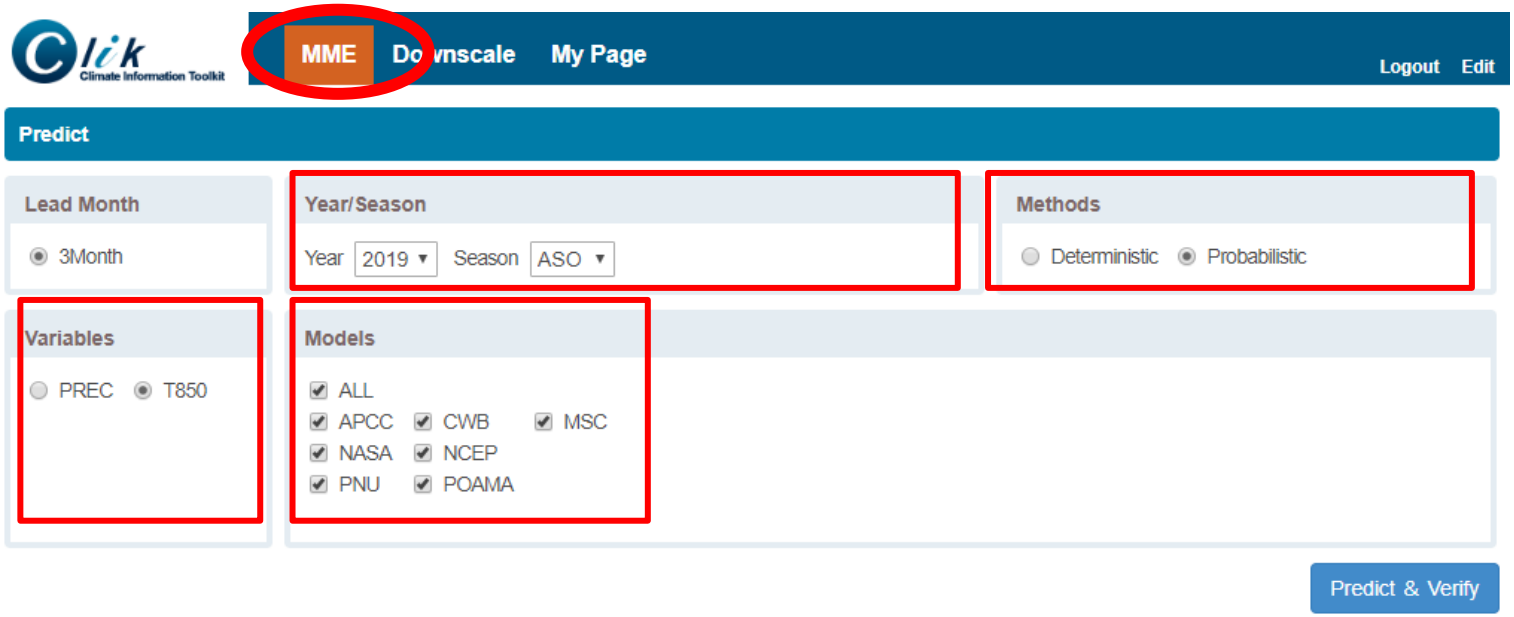
buttons

Base on global atmospheric circulation pattern!

Label bar for probabilities

2. Probabilistic MME

2-1. Customize your own prediction



① When

: 3-month lead prediction data is updated every month.

② Methods

: 1 deterministic (SCM) and 1 probabilistic (GAUS) MME methods

③ Variables

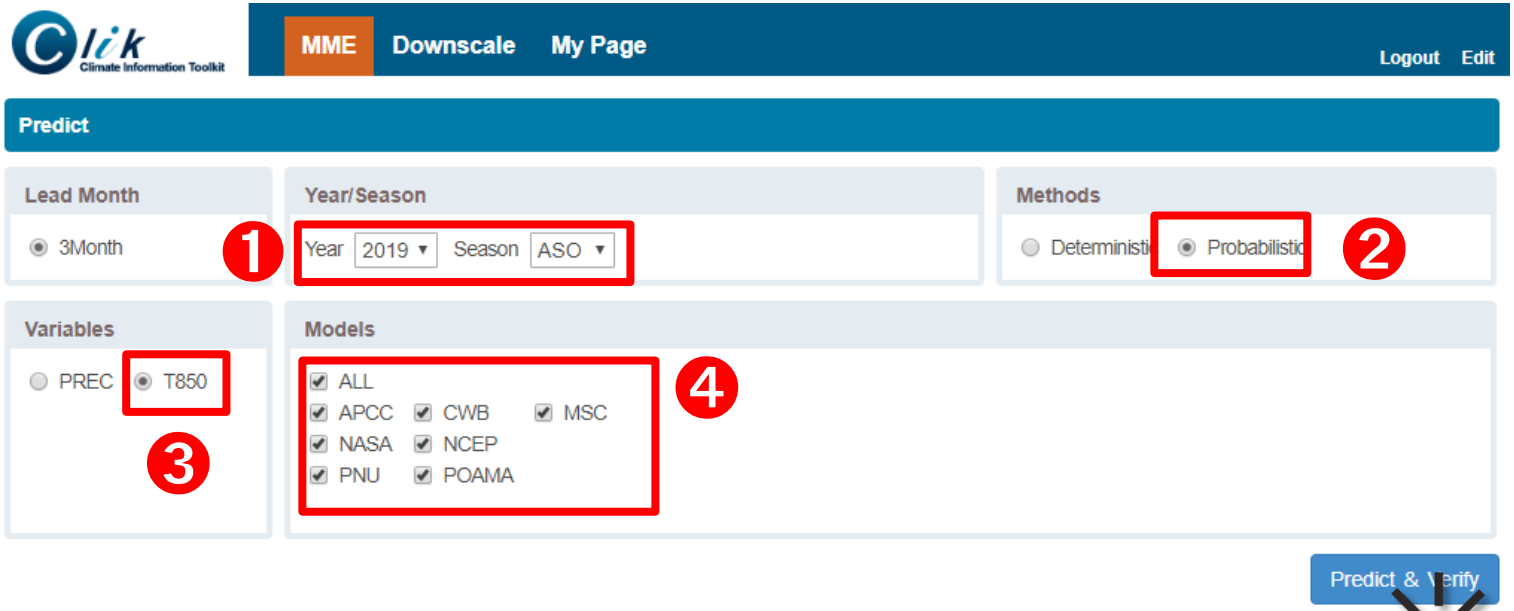
: the target variable

④ Models

: GCM models for a MME prediction

2. Probabilistic MME

2-1. Customize your own prediction



① **When** (**2019/ASO**)

: 3-month lead prediction data is updated every month.

② **Methods** (**Probabilistic**)

: 1 deterministic (SCM) and 1 probabilistic (GAUS) MME methods

③ **Variables** (**T850**)

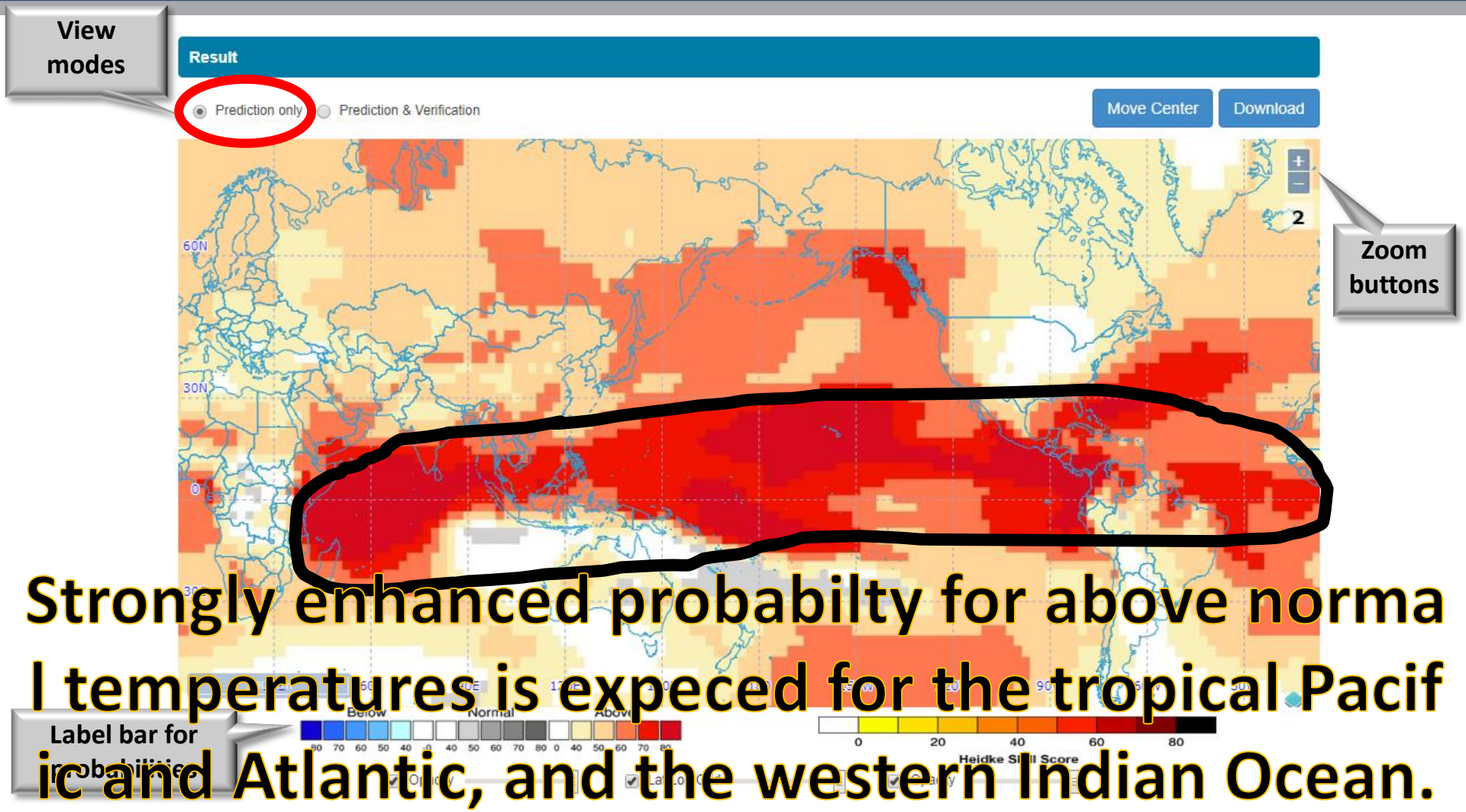
: the target variable

④ **Models** (**ALL**)

: GCM models for a MME prediction

2. Probabilistic MME

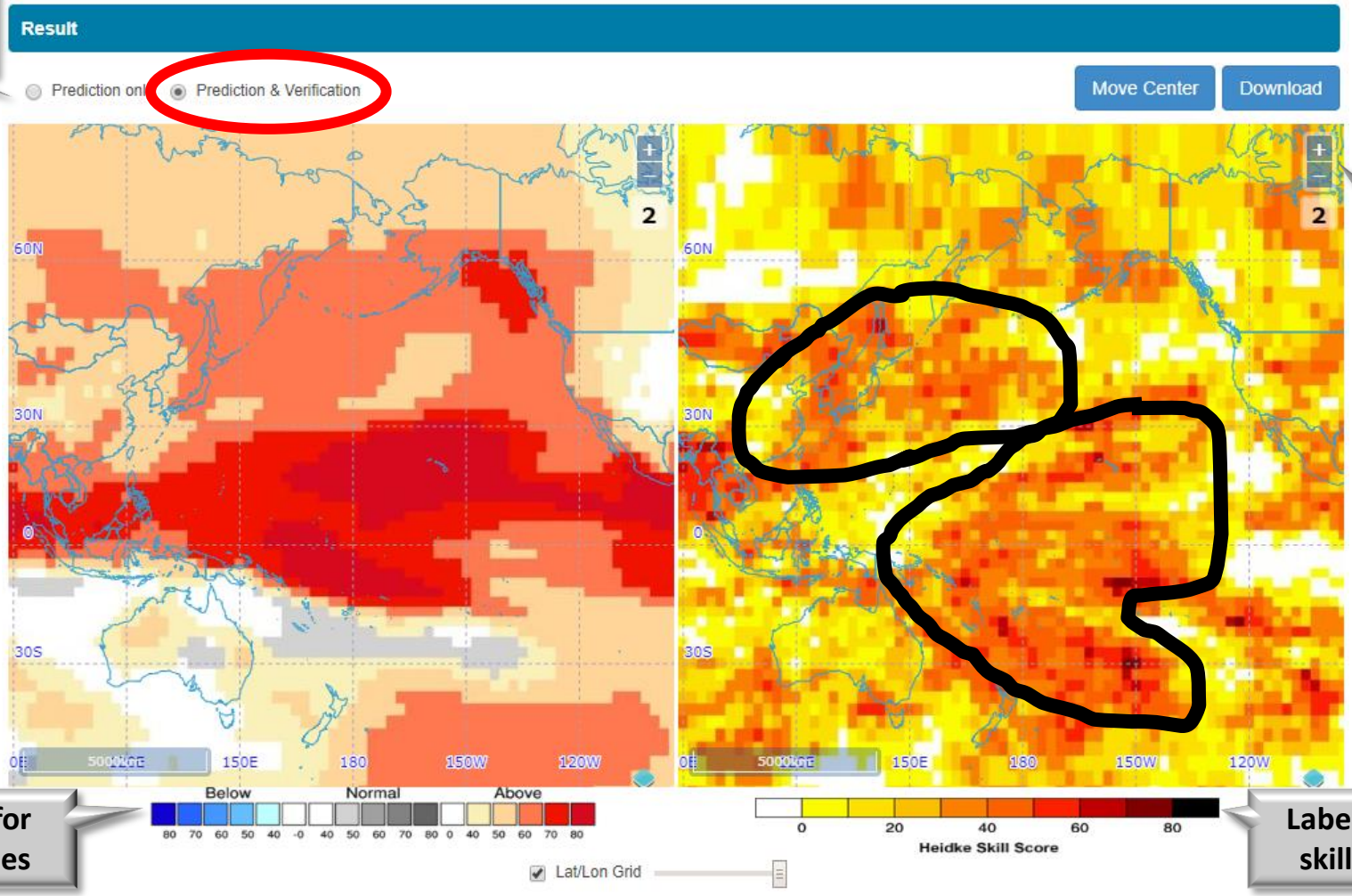
2-2. Read the map



Strongly enhanced probabilty for above normal temperatures is expeced for the tropical Pacific and Atlantic, and the western Indian Ocean.

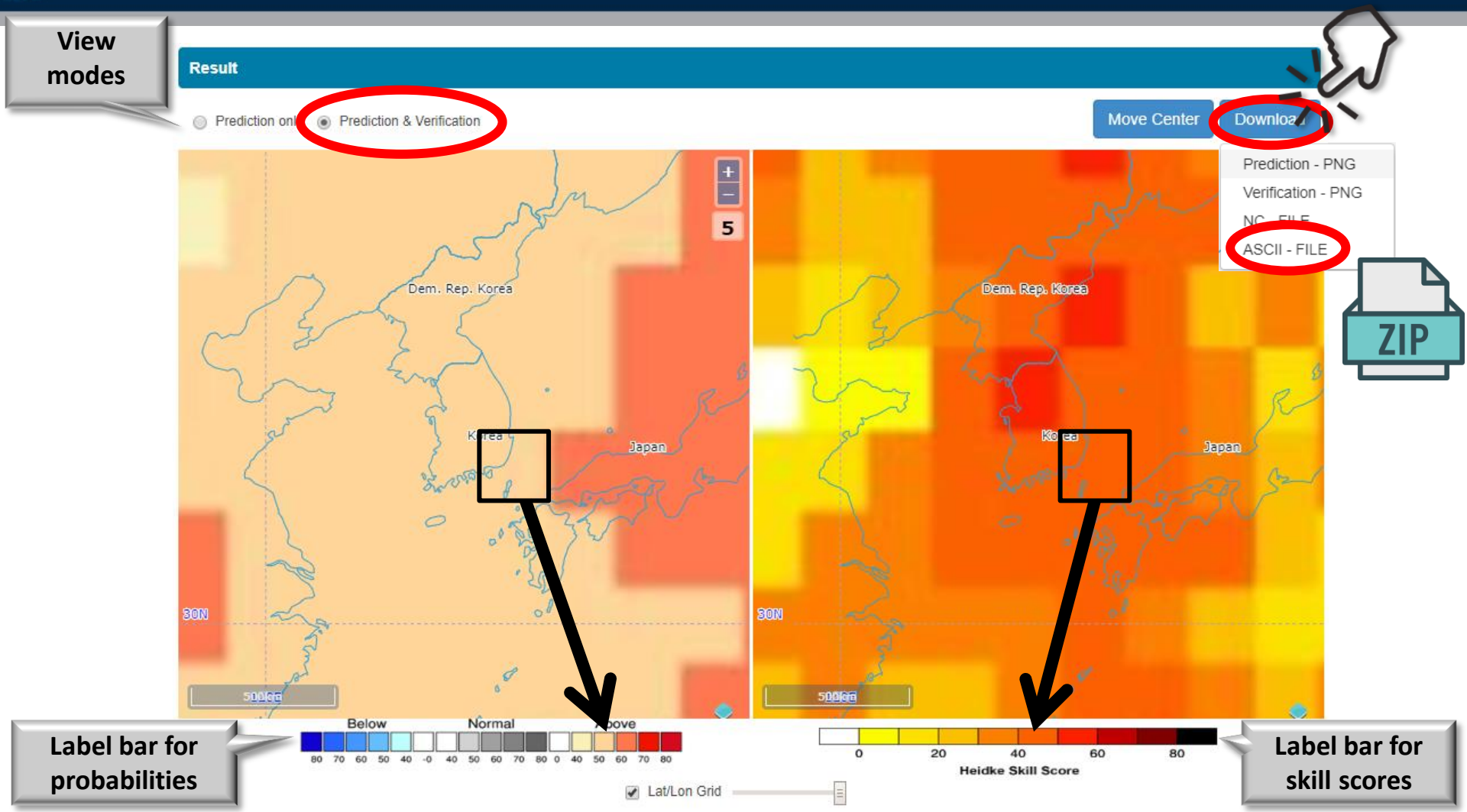
2. Probabilistic MME

2-2. Read the map



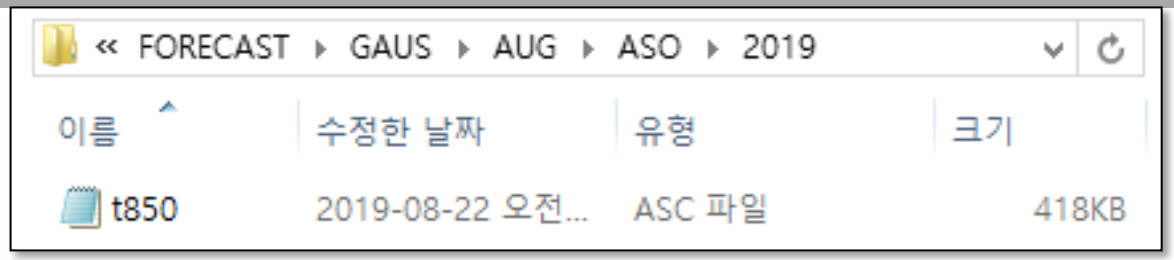
2. Probabilistic MME

2-2. Read the map



2. Probabilistic MME

2-3. Get quantities

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	A	B	C	D	E	F	G	H	I	J
1	[Variable=t850][MME method=GAUS][Models=APCC CWB MSC NASA NCEP PNU POAMA][Training Period=1983-2010]									
2	[Longitude=]	0	2.5	5	7.5	10	12.5	15	17.5	20
3	[time=2019ASO][lev=1][lat=-90]	28.536	28.534	28.531	28.529	28.526	28.524	28.522	28.521	28.52
4	[time=2019ASO][lev=1][lat=-87.5]	37.217	37.474	37.723	37.988	38.234	38.472	38.686	38.879	39.048
5	[time=2019ASO][lev=1][lat=-85]	40.32	40.466	40.627	40.823	41.047	41.301	41.58	41.867	42.146
6	[time=2019ASO][lev=1][lat=-82.5]	38.607	38.25	37.921	37.679	37.501	37.398	37.326	37.274	37.245
7	[time=2019ASO][lev=1][lat=-80]	36.794	36.043	35.311	34.636	34.069	33.62	33.249	32.894	32.54
8	[time=2019ASO][lev=1][lat=-77.5]	33.77	32.999	32.598	32.575	32.65	32.729	32.913	33.379	33.952
9	[time=2019ASO][lev=1][lat=-75]	36.643	35.704	35.311	35.606	36.303	36.758	37.311	38.505	39.843
10	[time=2019ASO][lev=1][lat=-72.5]	45.837	43.273	42.573	42.116	42.03	41.893	42.107	42.919	43.7
11	[time=2019ASO][lev=1][lat=-70]	38.622	39.177	40.02	40.639	40.954	41.118	41.314	41.615	41.966
12	[time=2019ASO][lev=1][lat=-67.5]	39.157	39.835	40.593	41.276	41.657	41.764	41.93	42.149	42.457
13	[time=2019ASO][lev=1][lat=-65]	36.354	37.617	38.459	39.221	39.962	40.56	41.344	42.171	42.878
14	[time=2019ASO][lev=1][lat=-62.5]	35.45	36.459	37.207	37.939	38.632	39.007	39.624	40.572	41.405
15	[time=2019ASO][lev=1][lat=-60]	34.738	35.474	36.511	37.426	37.788	37.756	38.034	38.392	38.797
16	[time=2019ASO][lev=1][lat=-57.5]	34.662	35.471	36.367	36.699	36.636	35.937	35.64	35.388	35.346
17	[time=2019ASO][lev=1][lat=-55]	36.928	37.476	37.56	37.45	36.72	35.561	34.22	32.739	31.835
18	[time=2019ASO][lev=1][lat=-52.5]	38.463	38.414	38.408	37.858	37.156	36.42	35.248	33.959	32.916
19	[time=2019ASO][lev=1][lat=-50]	40.206	40.357	39.888	39.013	38.378	38.298	38.343	38.09	37.371
20	[time=2019ASO][lev=1][lat=-47.5]	44.135	44.064	43.179	42.334	41.457	40.871	40.894	40.652	40.28
21	[time=2019ASO][lev=1][lat=-45]	48.783	48.709	48.195	47.581	46.603	45.964	45.194	44.26	43.292
22	[time=2019ASO][lev=1][lat=-42.5]	53.224	52.781	52.014	51.396	50.51	49.553	48.41	47.911	48.032
23	[time=2019ASO][lev=1][lat=-40]	58.653	58.183	57.306	55.661	53.928	52.168	50.753	50.486	49.811
24	[time=2019ASO][lev=1][lat=-37.5]	61.384	60.54	58.778	56.852	54.789	52.516	50.92	50.685	50.246
25	[time=2019ASO][lev=1][lat=-35]	61.074	59.657	58.159	56.185	53.004	50.847	49.211	49.552	49.464
26	[time=2019ASO][lev=1][lat=-32.5]	61.057	59.373	57.324	54.406	51.626	50.169	50.237	51.06	51.758
27	[time=2019ASO][lev=1][lat=-30]	59.67	56.852	53.721	51.832	50.455	49.963	50.802	52.644	56.797
28	[time=2019ASO][lev=1][lat=-27.5]	55.852	53.413	51.144	51.033	50.984	51.168	53.2	56.783	60.723
29	[time=2019ASO][lev=1][lat=-25]	52.499	51.729	52.001	52.879	53.007	53.66	56.127	60.735	60.872
30	[time=2019ASO][lev=1][lat=-22.5]	52.591	52.715	54.256	54.591	54.594	54.988	57.053	55.399	60.405

***Microsoft EXCEL* recommended!**

2. Probabilistic MME

2-3. Get quantities

	A	B	C	D	E	F	G	H	I	J
1	[Variable=t850][MME method=GAUS][Models=APCC CWB MSC NASA NCEP PNU POAMA][Training Period=1983-2010]									
2	[Longitude=]	0	2.5	5	7.5	10	12.5	15	17.5	20
3	[time=2019ASO][lev=1][lat=-90]	28.536	28.534	28.531	28.529	28.526	28.524	28.522	28.521	28.52
4	[time=2019ASO][lev=1][lat=-87.5]	37.2	37.474	37.723	37.988	38.234	38.472	38.686	38.879	39.048
5	[time=2019ASO][lev=1][lat=-85]	40.3	40.466	40.627	40.823	41.047	41.301	41.58	41.867	42.146
6	[time=2019ASO][lev=1][lat=-82.5]	38.6	38.25	37.921	37.679	37.501	37.398	37.326	37.274	37.245
7	[time=2019ASO][lev=1][lat=-80]	37.9	36.043	35.311	34.636	34.069	33.62	33.249	32.894	32.54
8	[time=2019ASO][lev=1][lat=-77.5]	33.77	2.999	32.598	32.575	32.65	32.729	32.913	33.379	33.952
9	[time=2019ASO][lev=1][lat=-75]	36.643	35.704	35.311	35.606	36.303	36.758	37.311	38.505	39.843
10	[time=2019ASO][lev=1][lat=-72.5]	45.837	43.273	42.573	42.116	42.03	41.893	42.107	42.919	43.7
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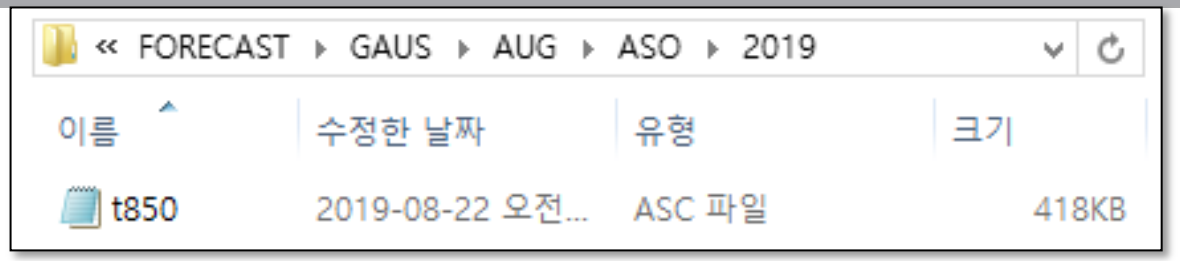
14	[time=2019ASO][lev=1][lat=-62.5]	35.45	36.459	37.207	37.939	38.632	39.007	39.624	40.572	41.405
15	[time=2019ASO][lev=1][lat=-60]	34.738	35.474	36.511	37.426	37.788	37.756	38.034	38.392	38.797
16	[time=2019ASO][lev=1][lat=-57.5]	34.662	35.471	36.367	36.699	36.636	35.937	35.64	35.388	35.346
17	[time=2019ASO][lev=1][lat=-55]	36.928	37.476	37.56	37.45	36.72	35.561	34.22	32.739	31.835
18	[time=2019ASO][lev=1][lat=-52.5]	38.463	38.414	38.408	37.858	37.156	36.42	35.248	33.959	32.916
19	[time=2019ASO][lev=1][lat=-50]	40.206	40.357	39.888	39.013	38.378	38.298	38.343	38.09	37.371
20	[time=2019ASO][lev=1][lat=-47.5]	44.135	44.064	43.179	42.334	41.457	40.871	40.894	40.652	40.28
21	[time=2019ASO][lev=1][lat=-45]	48.783	48.709	48.195	47.581	46.603	45.964	45.194	44.26	43.292
22	[time=2019ASO][lev=1][lat=-42.5]	53.224	52.781	52.014	51.396	50.51	49.553	48.41	47.911	48.032
23	[time=2019ASO][lev=1][lat=-40]	58.653	58.183	57.306	55.661	53.928	52.168	50.753	50.486	49.811
24	[time=2019ASO][lev=1][lat=-37.5]	61.384	60.54	58.778	56.852	54.789	52.516	50.92	50.685	50.246
25	[time=2019ASO][lev=1][lat=-35]	61.074	59.657	58.159	56.185	53.004	50.847	49.211	49.552	49.464
26	[time=2019ASO][lev=1][lat=-32.5]	61.057	59.373	57.324	54.406	51.626	50.169	50.237	51.06	51.758

2. Probabilistic MME

2-3. Get quantities



Busan

- Longitude ≒ 127.5°E
- Latitude ≒ 35°N

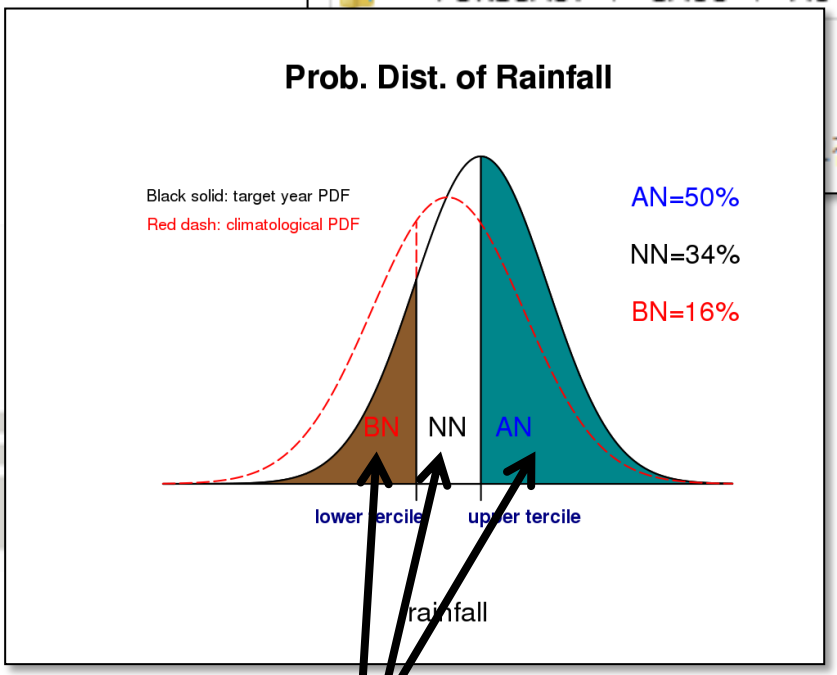
	A	AY	AZ	BA	BB	BC
1	[Variable=t850][MME method=GAUS					
2	[Longitude=]	122.5	125	127.5	130	132.5
51	[time=2019ASO][lev=1][lat=30]	53.369	53.207	55.543	56.601	57.28
52	[time=2019ASO][lev=1][lat=32.5]	55.628	54.643	55.535	57.11	59.454
53	[time=2019ASO][lev=1][lat=35]	56.963	56.441	56.257	58.168	60.151
54	[time=2019ASO][lev=1][lat=37.5]	56.374	57.669	58.836	58.694	59.231
55	[time=2019ASO][lev=1][lat=40]	55.812	58.237	59.681	58.237	58.793

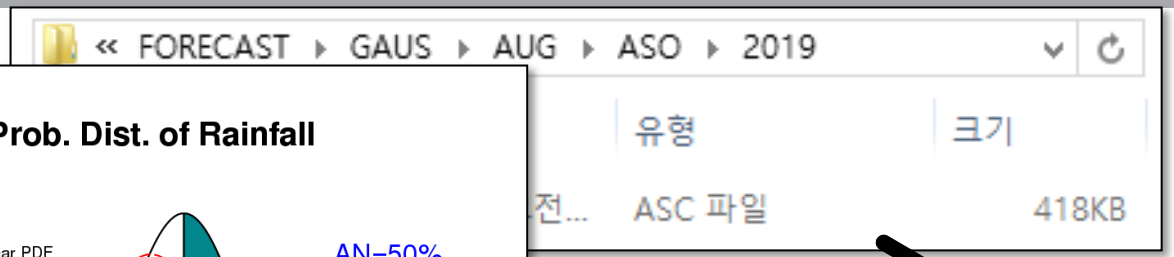
	A	AY	AZ	BA	BB	BC
1	[Variable=t850][MME method=GAUS					
2	[Longitude=]	122.5	125	127.5	130	132.5
124	[time=2019ASO][lev=2][lat=30]	29.736	29.786	28.188	28.554	29.026
125	[time=2019ASO][lev=2][lat=32.5]	29.515	30.004	29.101	29.222	28.957
126	[time=2019ASO][lev=2][lat=35]	29.57	29.496	29.664	29.484	29.101
127	[time=2019ASO][lev=2][lat=37.5]	29.908	29.762	30.024	29.847	29.552
128	[time=2019ASO][lev=2][lat=40]	29.917	29.347	28.653	29.273	28.972

	A	AY	AZ	BA	BB	BC
1	[Variable=t850][MME method=GAUS					
2	[Longitude=]	122.5	125	127.5	130	132.5
197	[time=2019ASO][lev=3][lat=30]	16.896	17.008	16.269	14.844	13.694
198	[time=2019ASO][lev=3][lat=32.5]	14.857	15.353	15.364	13.668	11.589
199	[time=2019ASO][lev=3][lat=35]	13.467	14.063	14.079	12.348	10.748
200	[time=2019ASO][lev=3][lat=37.5]	13.717	12.569	11.14	11.459	11.217
201	[time=2019ASO][lev=3][lat=40]	14.271	12.416	11.666	12.49	12.236

2. Probabilistic MME

2-3. Get quantities





Tercile bins

Lev 1	AN	52.257%
Lev 2	NN	29.664%
Lev 3	BN	14.079%

sum = 100%

LONGITUDE

LATITUDE

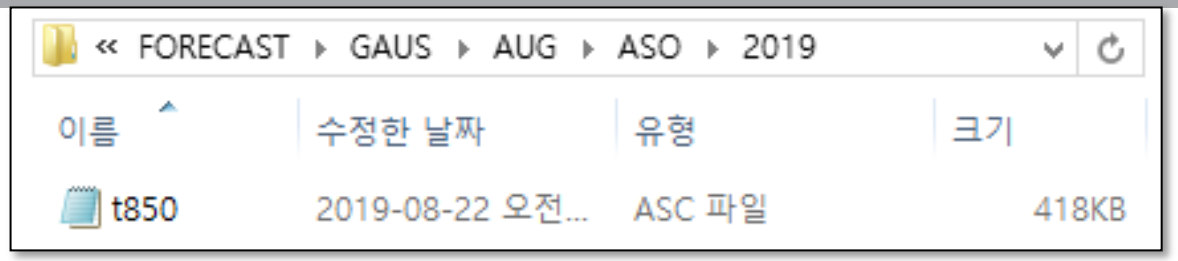
	A	AY	AZ	BA	BB	BC
1	[Variable=t850][MME method=GAUS					
2	[Longitude=]	122.5	125	127.5	130	132.5
51	[time=2019ASO][lev=1][lat=30]	53.369	53.207	55.543	56.601	57.28
52	[time=2019ASO][lev=1][lat=32.5]	55.628	54.643	55.535	57.11	59.454
53	[time=2019ASO][lev=1][lat=35]	56.963	56.441	56.257	58.168	60.151
54	[time=2019ASO][lev=1][lat=37.5]	56.374	57.669	58.836	58.694	59.231
55	[time=2019ASO][lev=1][lat=40]	55.812	58.237	59.681	58.237	58.793

	A	AY	AZ	BA	BB	BC
1	[Variable=t850][MME method=GAUS					
2	[Longitude=]	122.5	125	127.5	130	132.5
124	[time=2019ASO][lev=2][lat=30]	29.736	29.786	28.188	28.554	29.026
125	[time=2019ASO][lev=2][lat=32.5]	29.515	30.004	29.101	29.222	28.957
126	[time=2019ASO][lev=2][lat=35]	29.57	29.496	29.664	29.484	29.101
127	[time=2019ASO][lev=2][lat=37.5]	29.908	29.762	30.024	29.847	29.552
128	[time=2019ASO][lev=2][lat=40]	29.917	29.347	29.653	29.273	28.972

	A	AY	AZ	BA	BB	BC
1	[Variable=t850][MME method=GAUS					
2	[Longitude=]	122.5	125	127.5	130	132.5
197	[time=2019ASO][lev=3][lat=30]	16.896	17.008	16.269	14.844	13.694
198	[time=2019ASO][lev=3][lat=32.5]	14.857	15.353	15.364	13.668	11.589
199	[time=2019ASO][lev=3][lat=35]	13.467	14.063	14.079	12.348	10.748
200	[time=2019ASO][lev=3][lat=37.5]	13.717	12.569	11.14	11.459	11.217
201	[time=2019ASO][lev=3][lat=40]	14.271	12.416	11.666	12.49	12.236

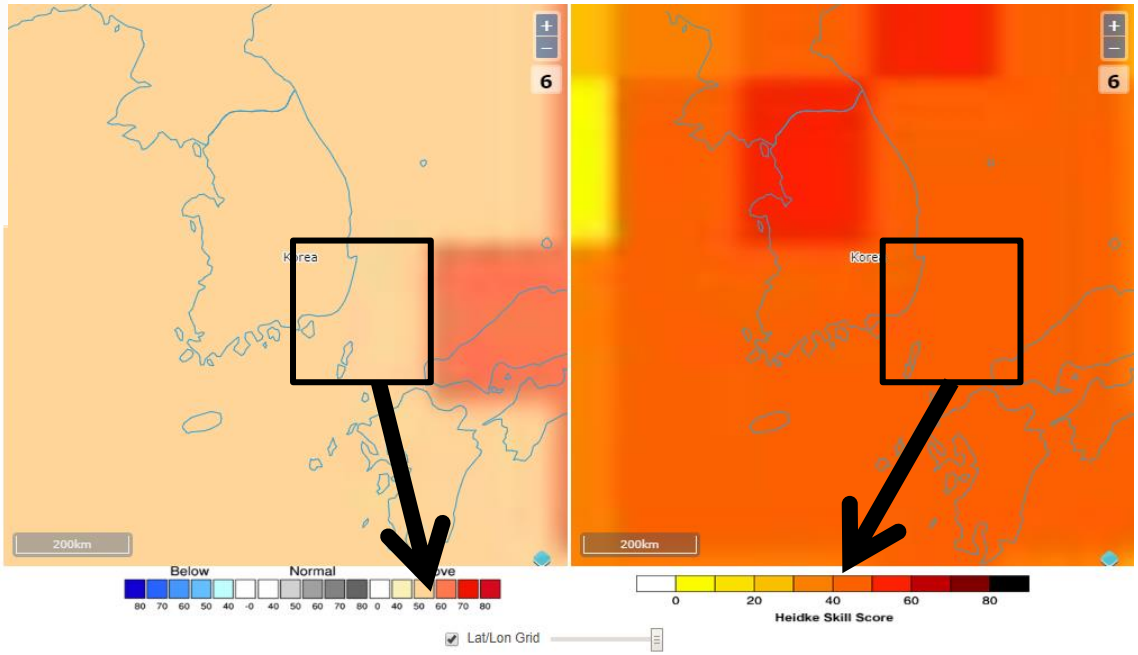
2. Probabilistic MME

2-3. Get quantities



Busan

- Longitude ≒ 127.5°E
- Latitude ≒ 35°N



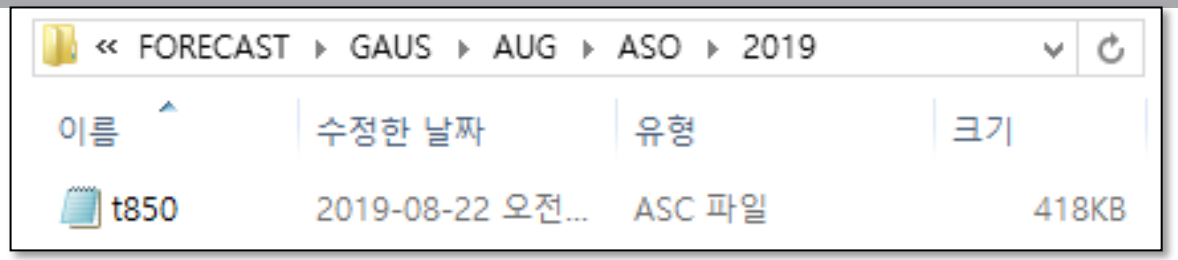
Tercile bins

Lev 1	AN	52.257%
Lev 2	NN	29.664%
Lev 3	BN	14.079%

sum = 100%

2. Probabilistic MME

2-3. Get quantities



Busan

- Longitude ≒ 127.5°E
- Latitude ≒ 35°N

Tercile bins

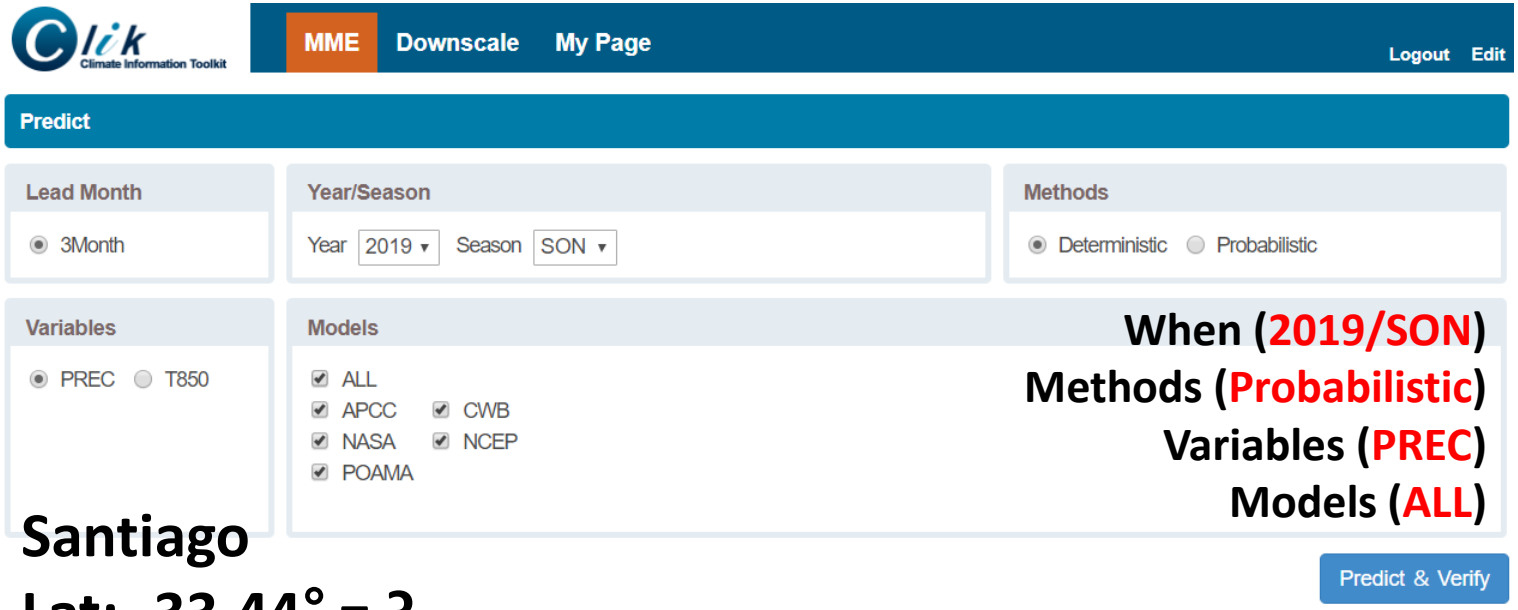
Lev 1	AN	52.257%
Lev 2	NN	29.664%
Lev 3	BN	14.079%

sum = 100%

Probability for temperature at 850 hPa for Busan

2. Probabilistic MME

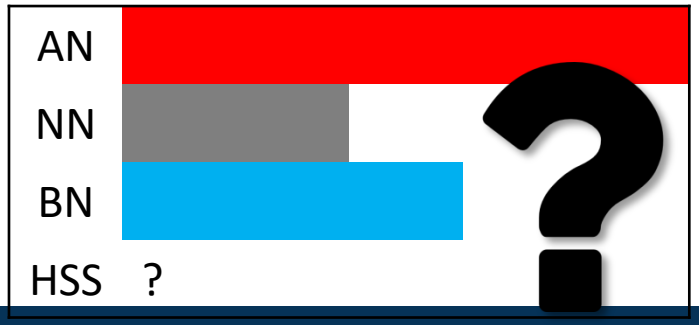
Practice!



Santiago

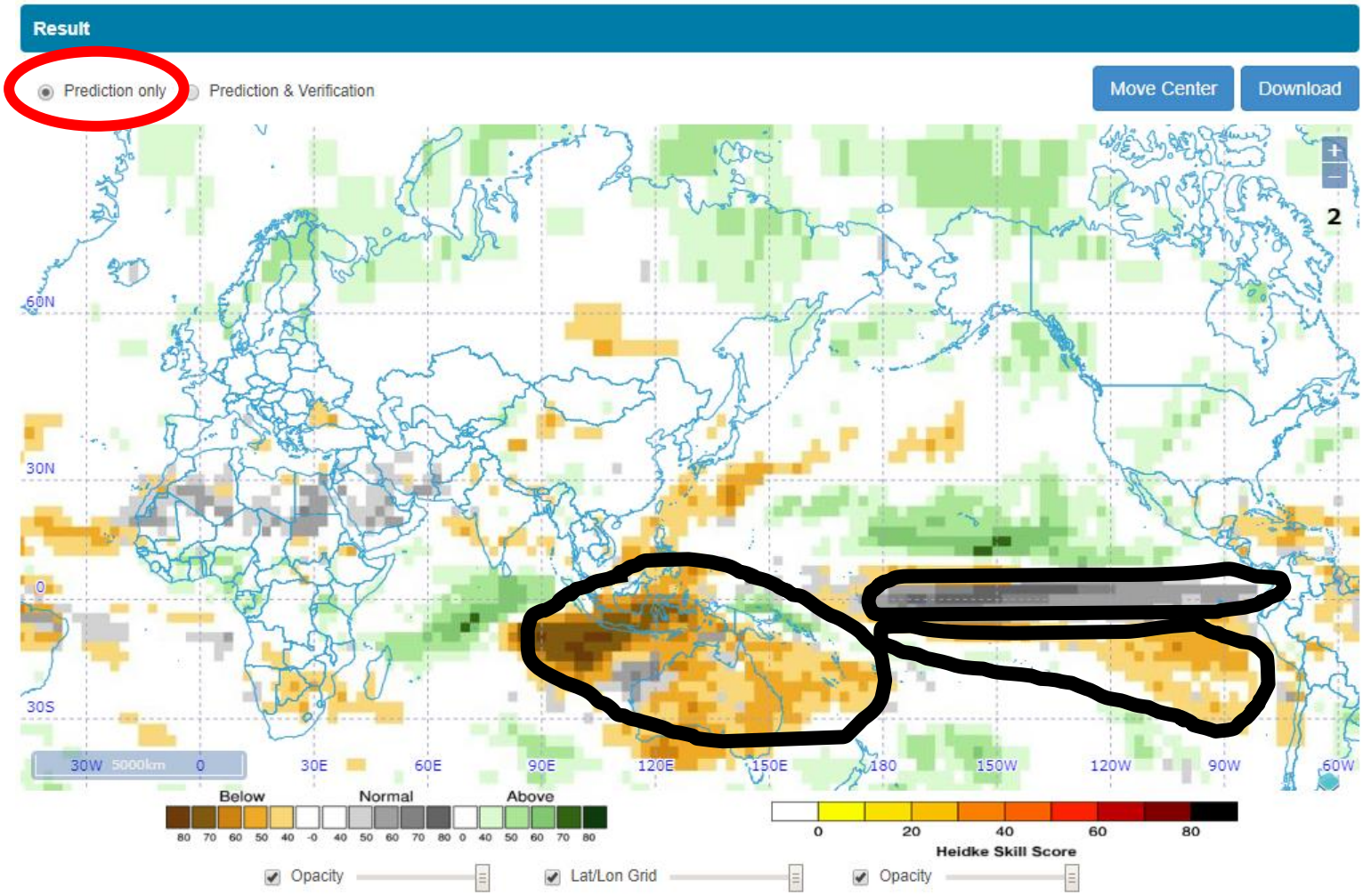
Lat: -33.44° = ?

Lon: -70.68° = ?



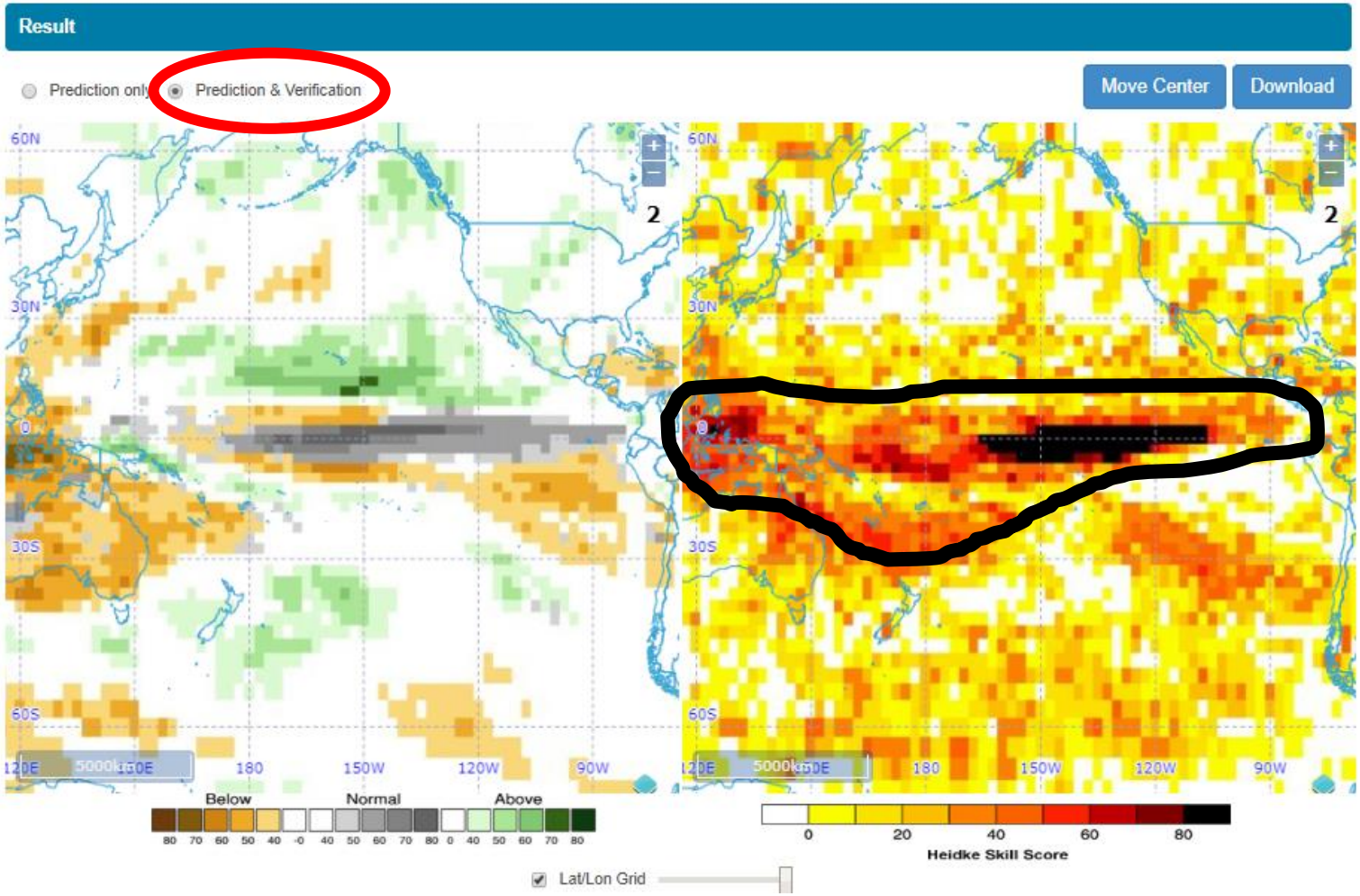
2. Probabilistic MME

Practice!



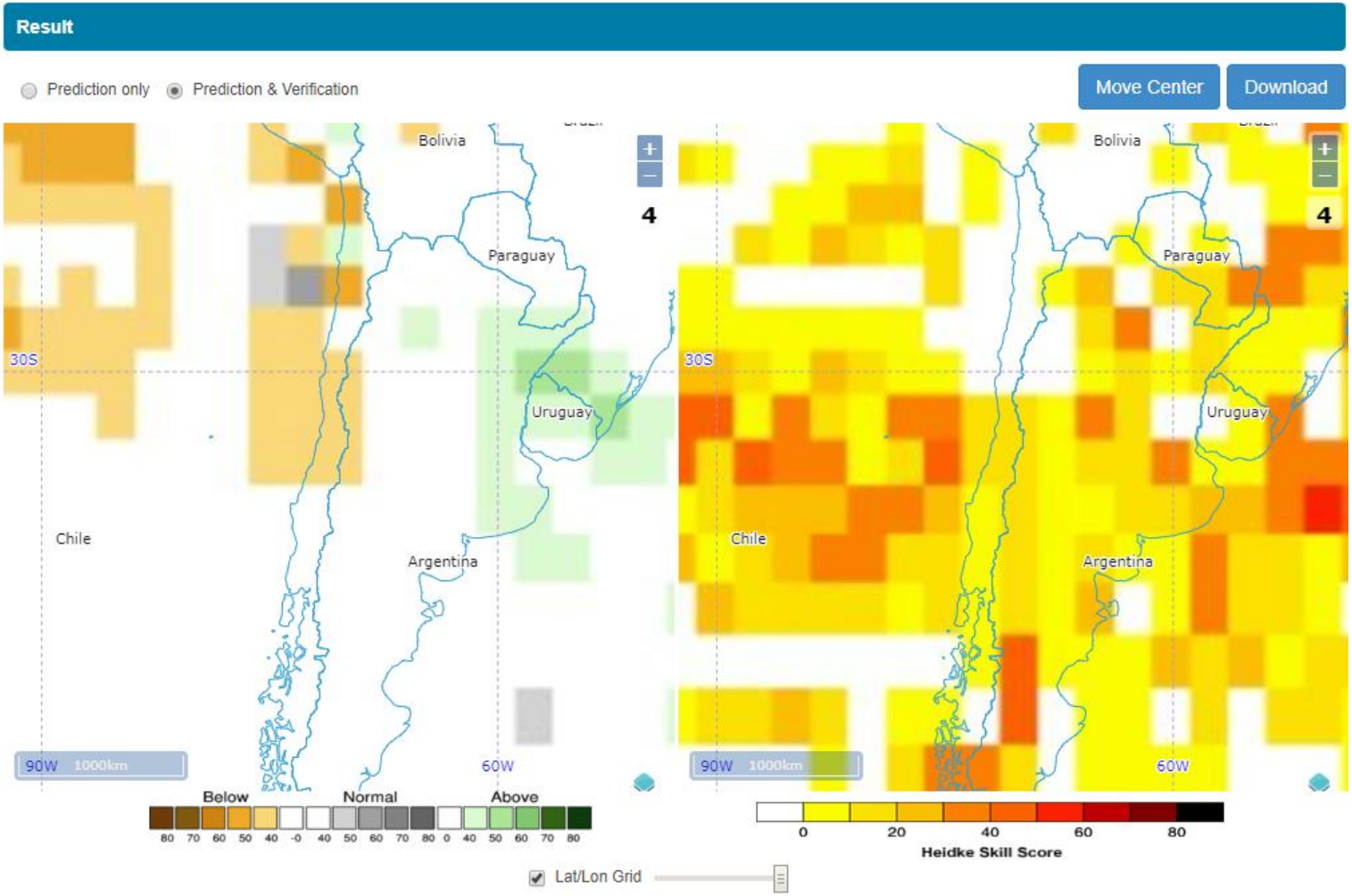
2. Probabilistic MME

Practice!



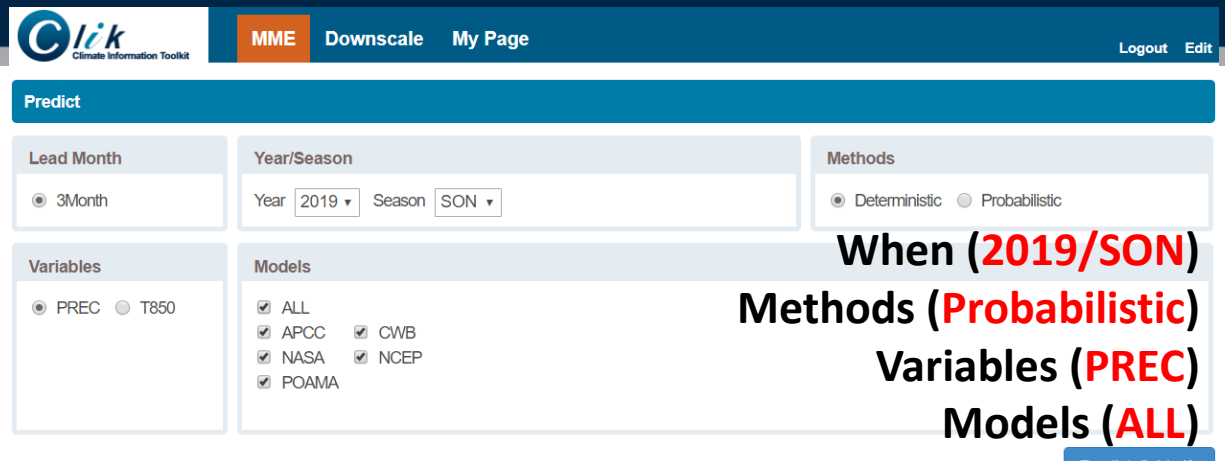
2. Probabilistic MME

Practice!



2. Probabilistic MME

Practice!



When (2019/SON)

Methods (Probabilistic)

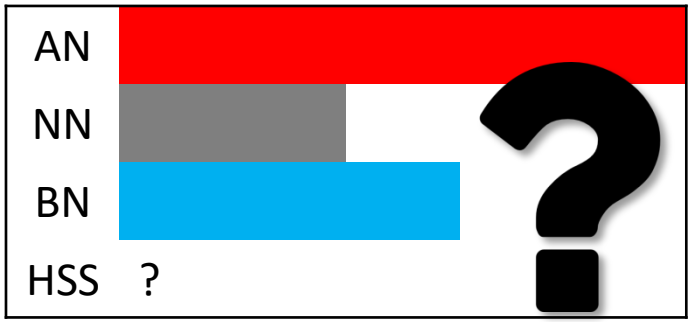
Variables (PREC)

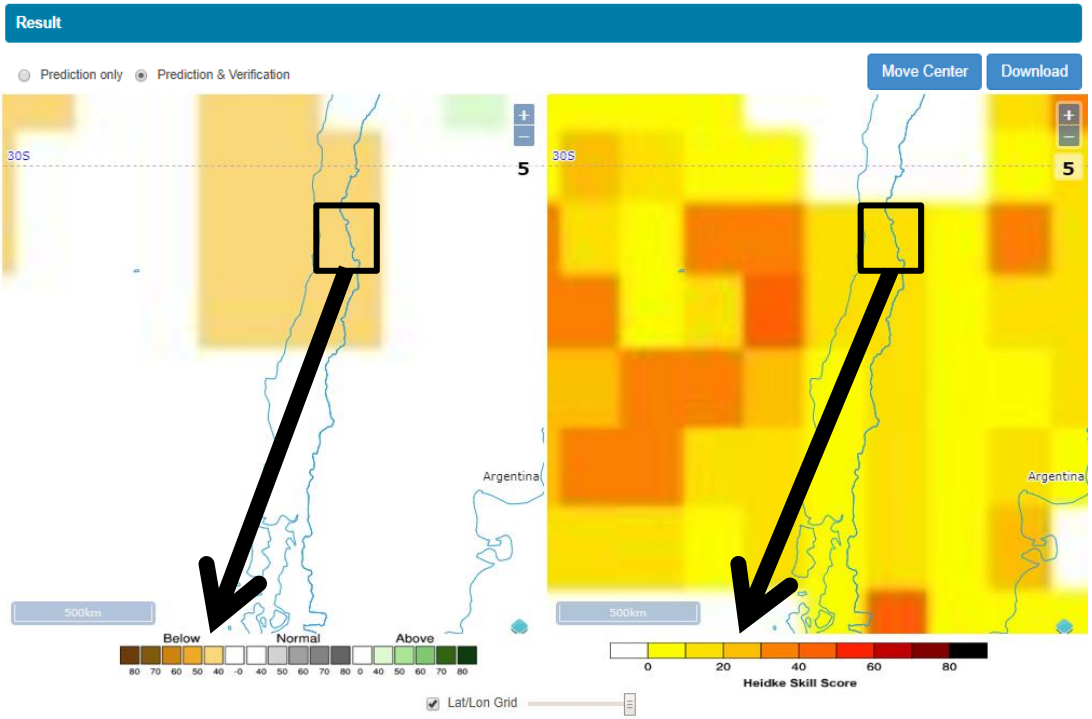
Models (ALL)

Santiago

Lat: -33.44° = ?

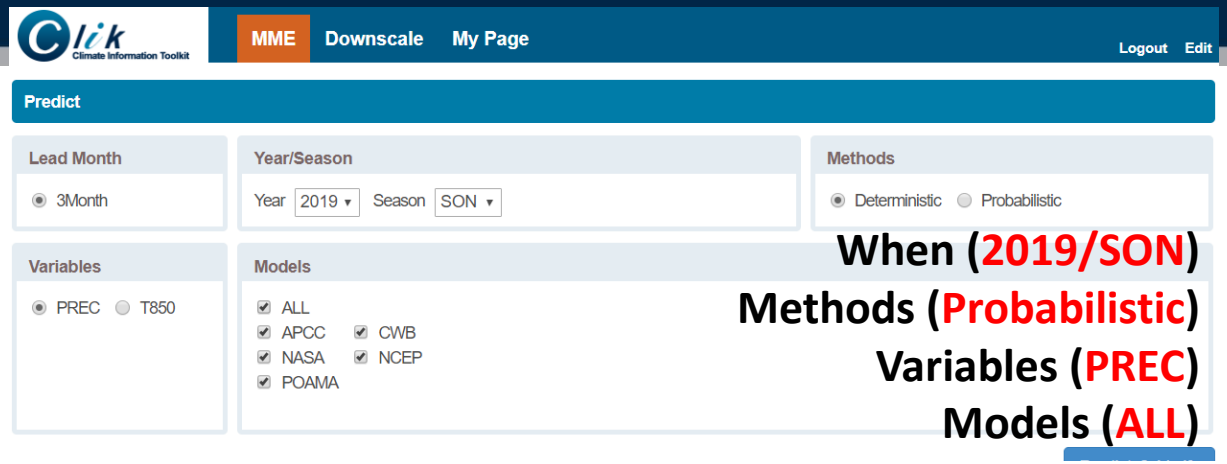
Lon: -70.68° = ?





2. Probabilistic MME

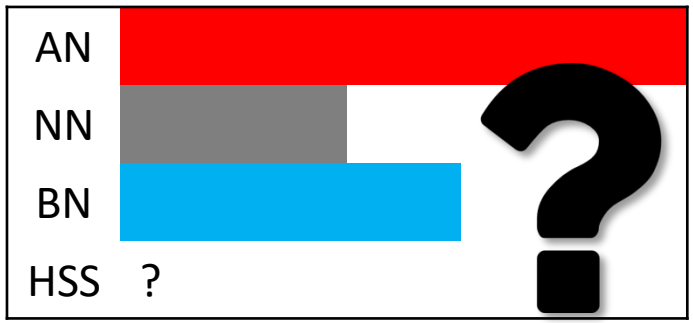
Practice!

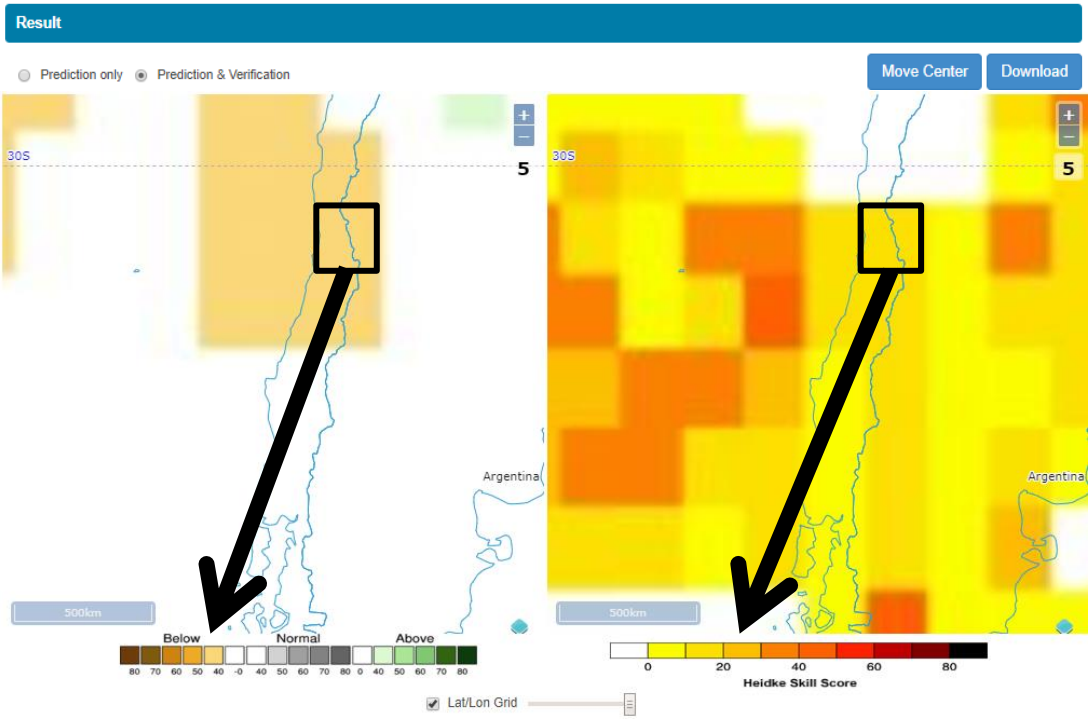


Santiago

Lat: -33.44° = ?

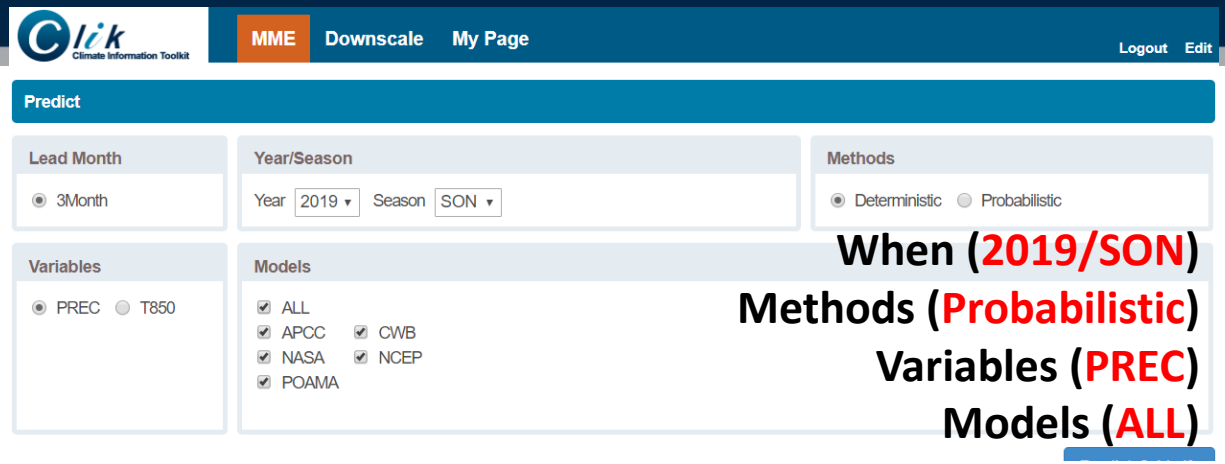
Lon: -70.68° = 289.32





2. Probabilistic MME

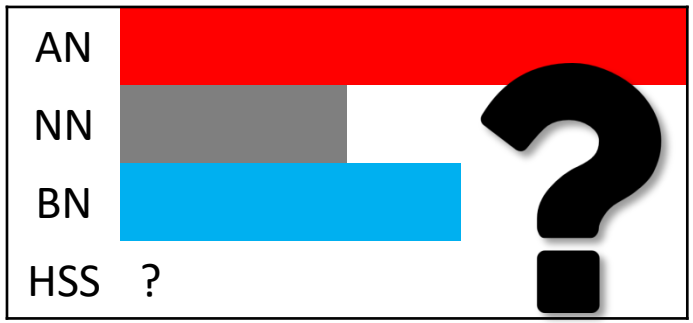
Practice!

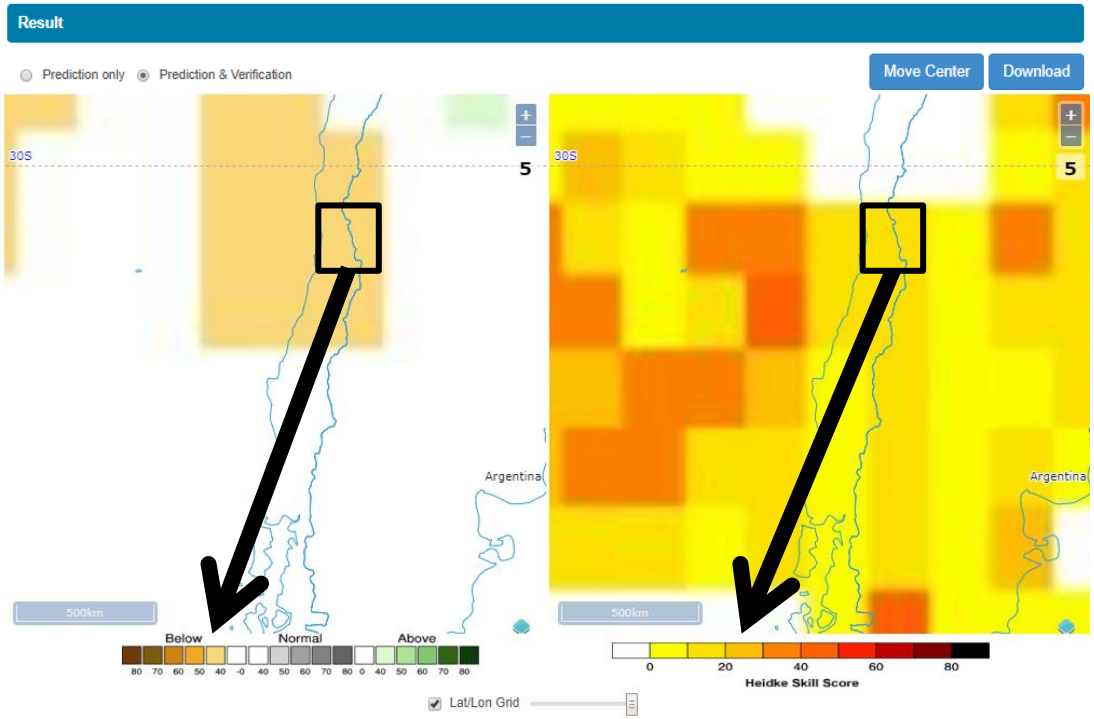


Santiago

Lat: -33.44° ≒ 32.5°

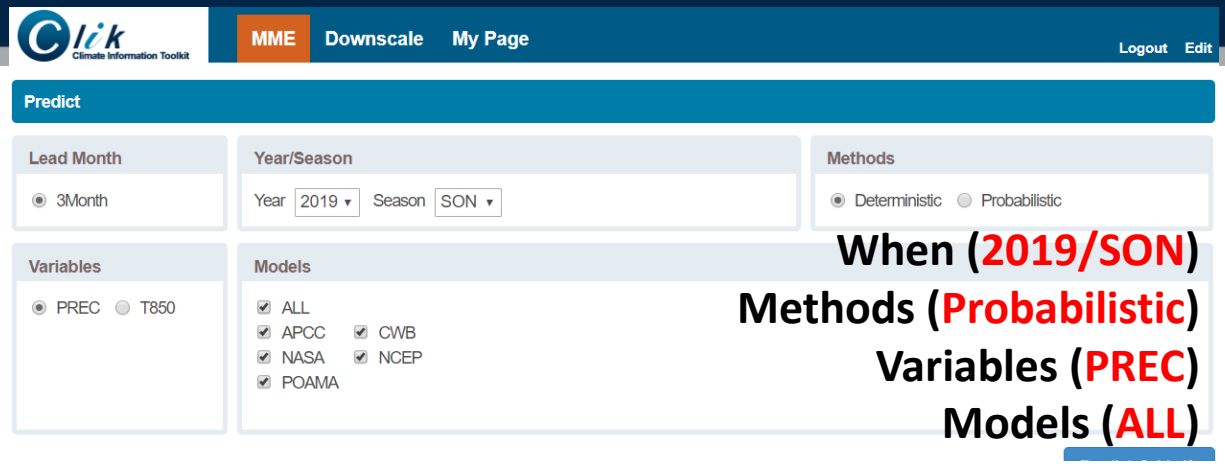
Lon: -70.68° = 289.32





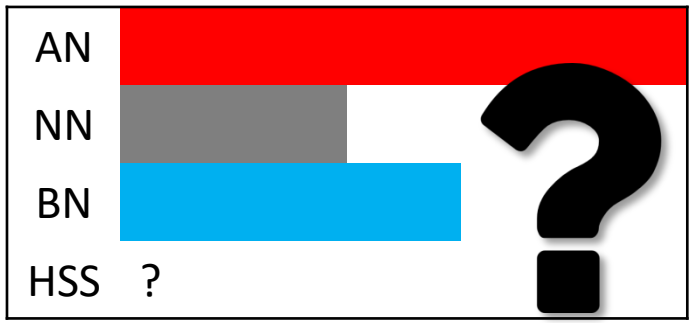
2. Probabilistic MME

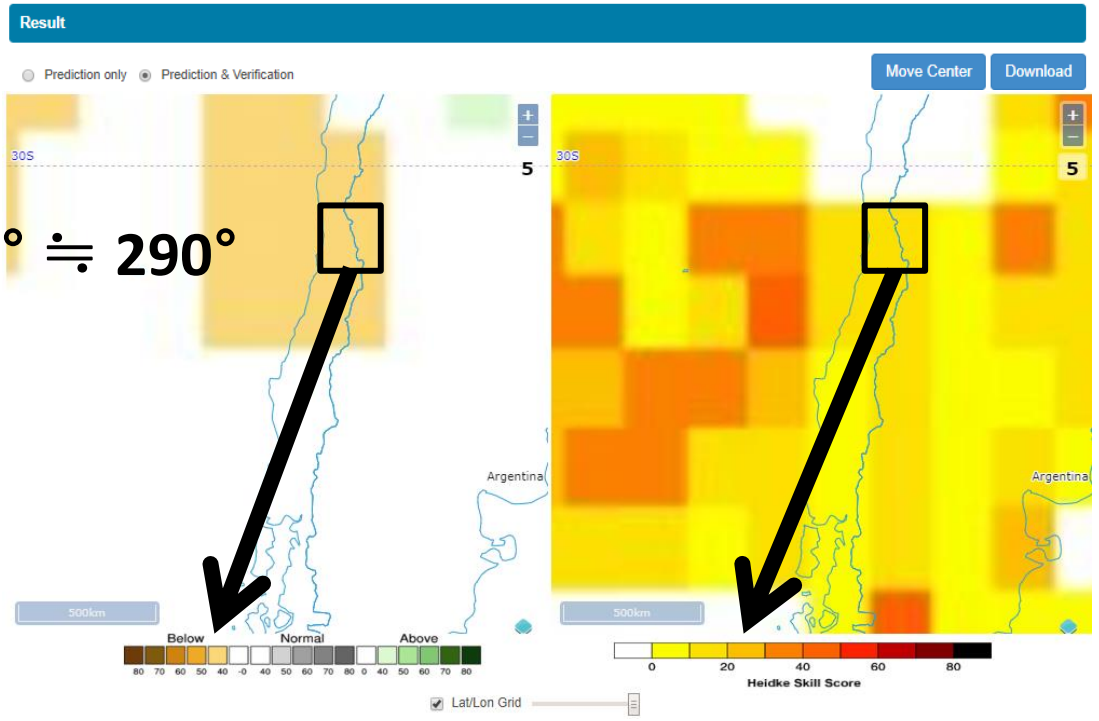
Practice!



When (2019/SON)
Methods (Probabilistic)
Variables (PREC)
Models (ALL)

Santiago
Lat: -33.44° ≒ 32.5°
Lon: -70.68° = 289.32° ≒ 290°





2. Probabilistic MME

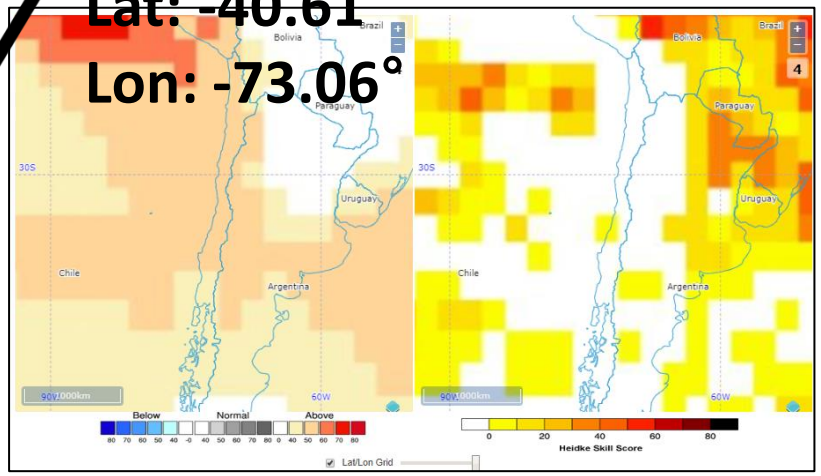
Practice!

Santiago
Lat: 32.5°
Lon: 290°

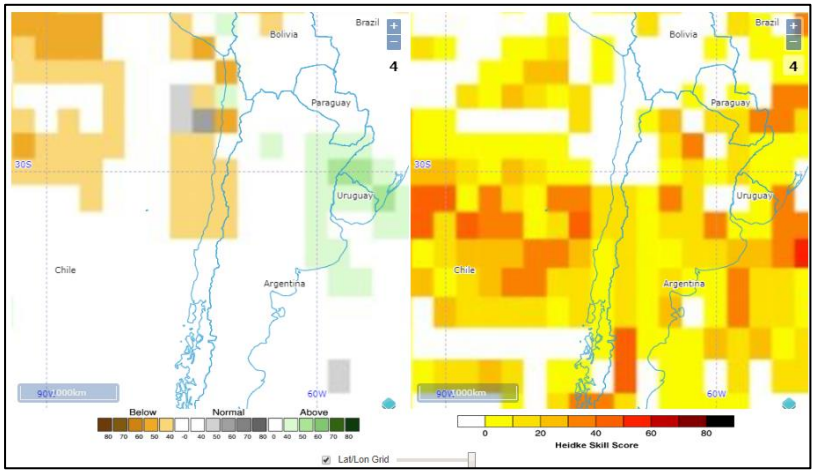
Calama
Lat: -22.5°
Lon: -68.9°

Osorno
Lat: -40.61°
Lon: -73.06°

	AN	NN	BN	HSS
T850	?	?	?	?



	AN	NN	BN	HSS
PREC	?	?	?	?



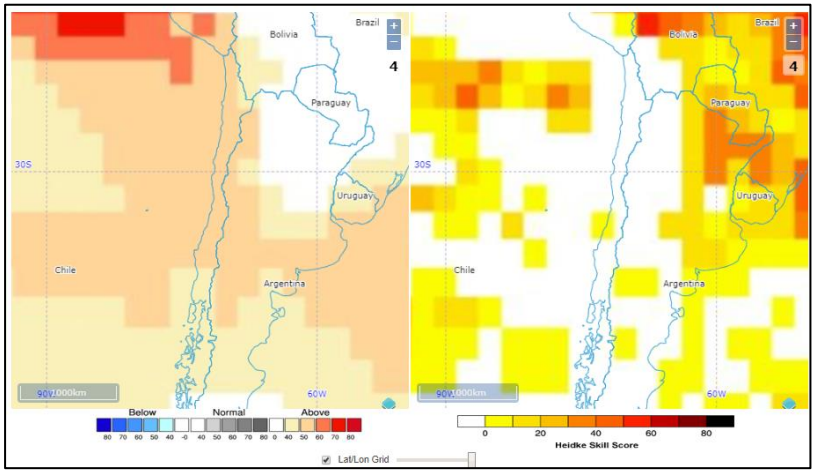
2. Probabilistic MME

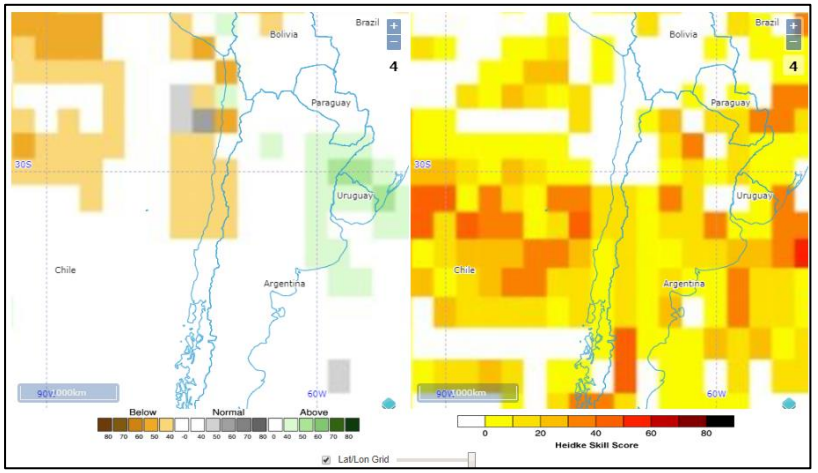
Practice!

Santiago
Lat: 32.5°
Lon: 290°

	AN	NN	BN	HSS
T850				

	AN	NN	BN	HSS
PREC				





2. Probabilistic MME

Practice!

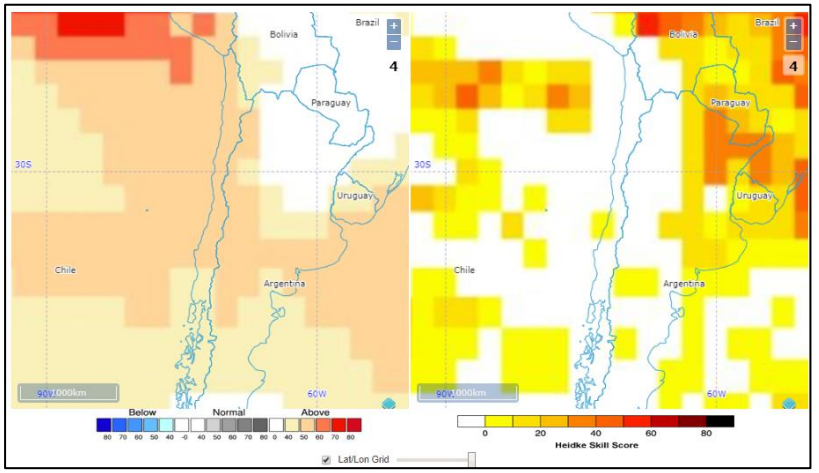
Calama
Lat: -22.5°
Lon: -68.9°

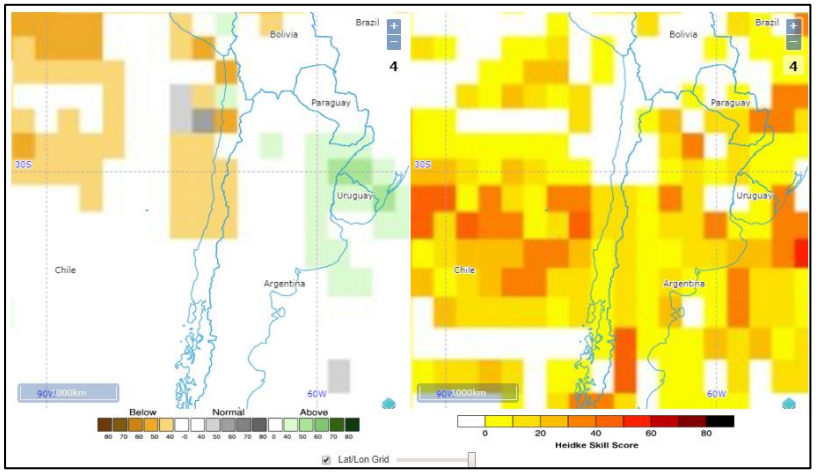
T850

AN	NN	BN	HSS

PREC

AN	NN	BN	HSS



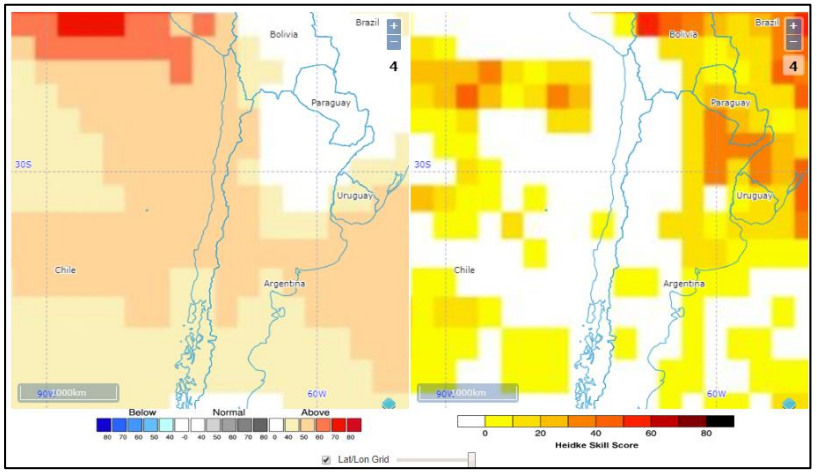


2. Probabilistic MME

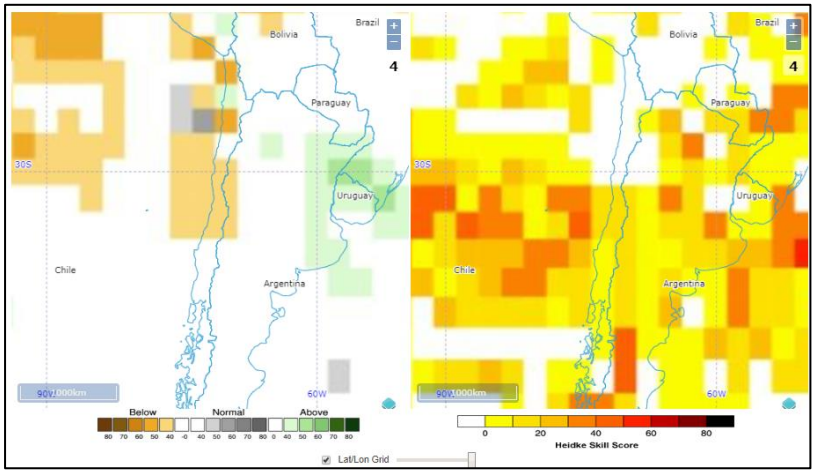
Practice!

Osorno
Lat: -40.61°
Lon: -73.06°

	AN	NN	BN	HSS
T850				



	AN	NN	BN	HSS
PREC				

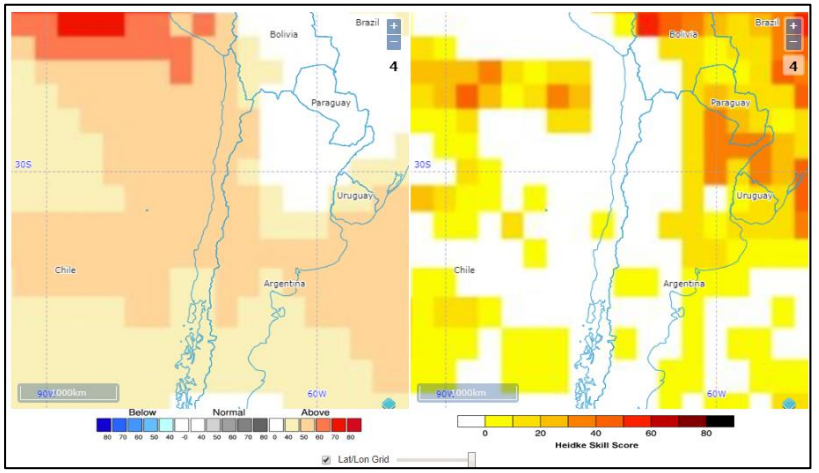


2. Probabilistic MME

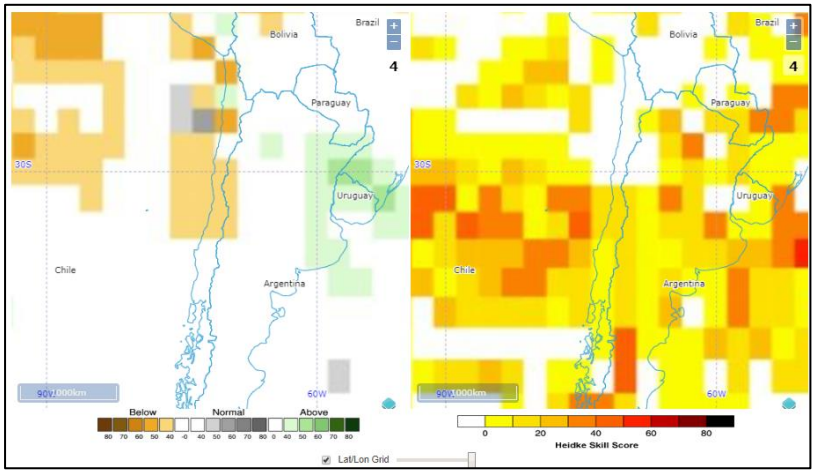
Practice!

Santiago
Lat: -32.5°
Lon: 290°

	AN	NN	BN	HSS
T850	54.144	24.842	21.014	-



	AN	NN	BN	HSS
PREC	16.654	35.697	47.649	10~20



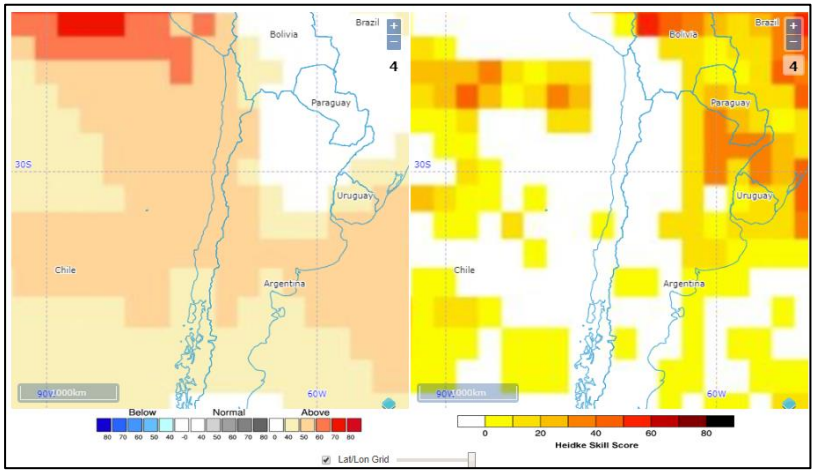
2. Probabilistic MME

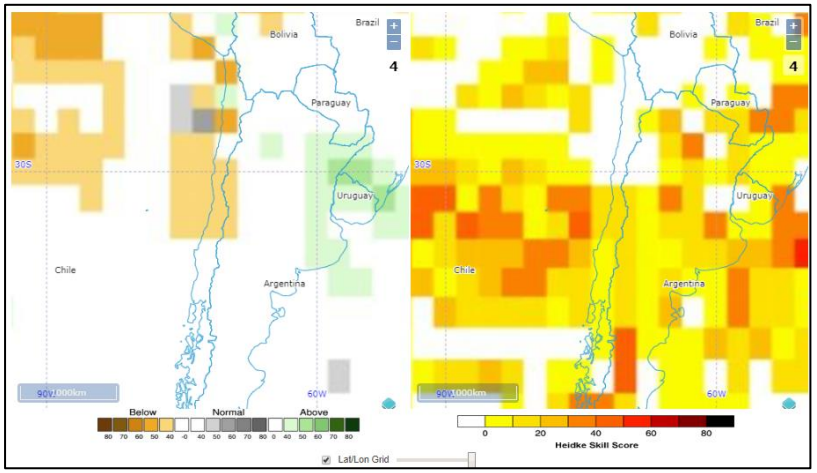
Practice!

Calama
Lat: -22.5°
Lon: 290°

	AN	NN	BN	HSS
T850	59.251	25.407	15.342	-

	AN	NN	BN	HSS
PREC	44.796	31.456	23.749	-





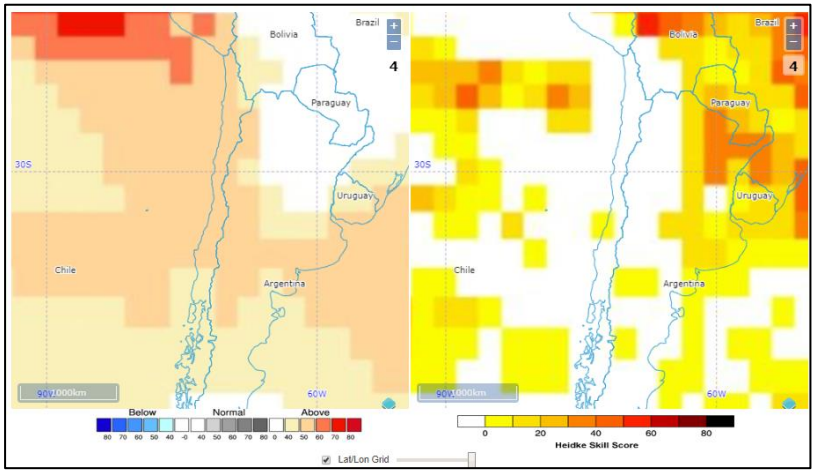
2. Probabilistic MME

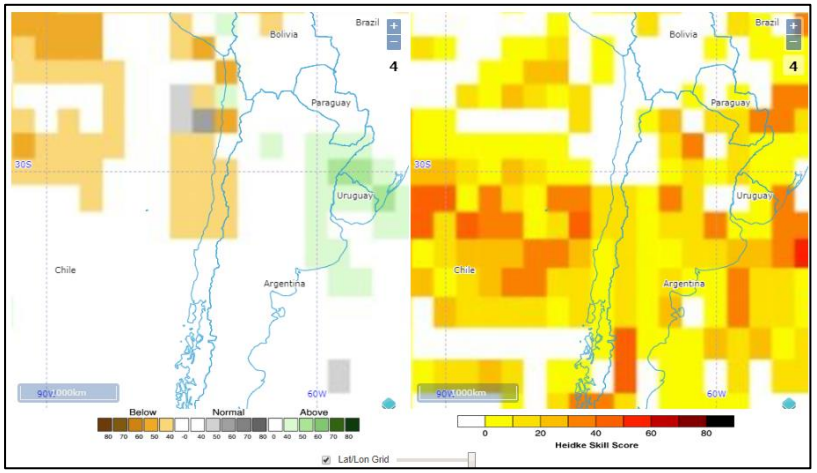
Practice!

Osorno
Lat: -40°
Lon: 287.5°

	AN	NN	BN	HSS
T850	47.736	30.346	21.919	-

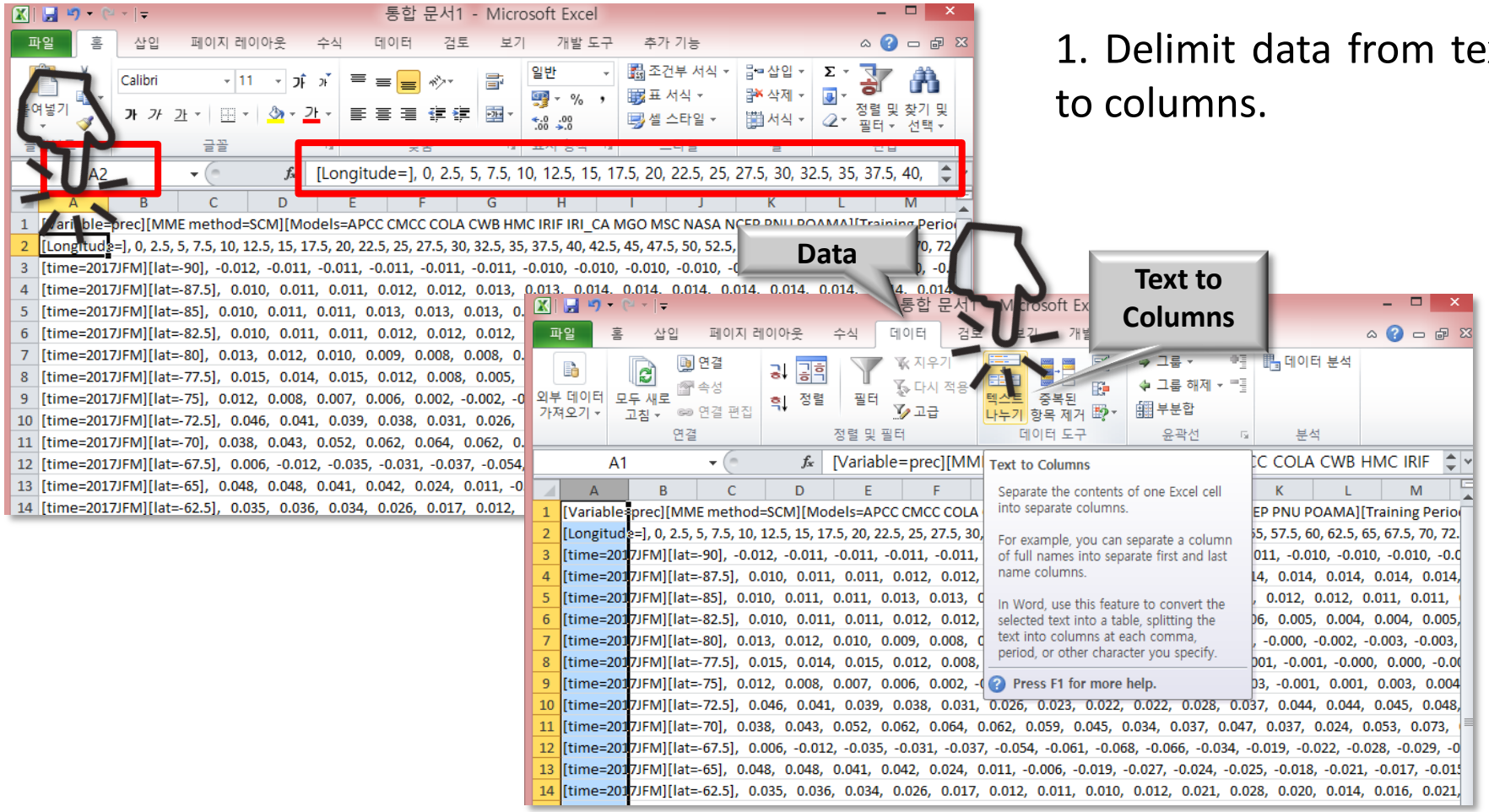
	AN	NN	BN	HSS
PREC	27.178	35.439	37.383	-





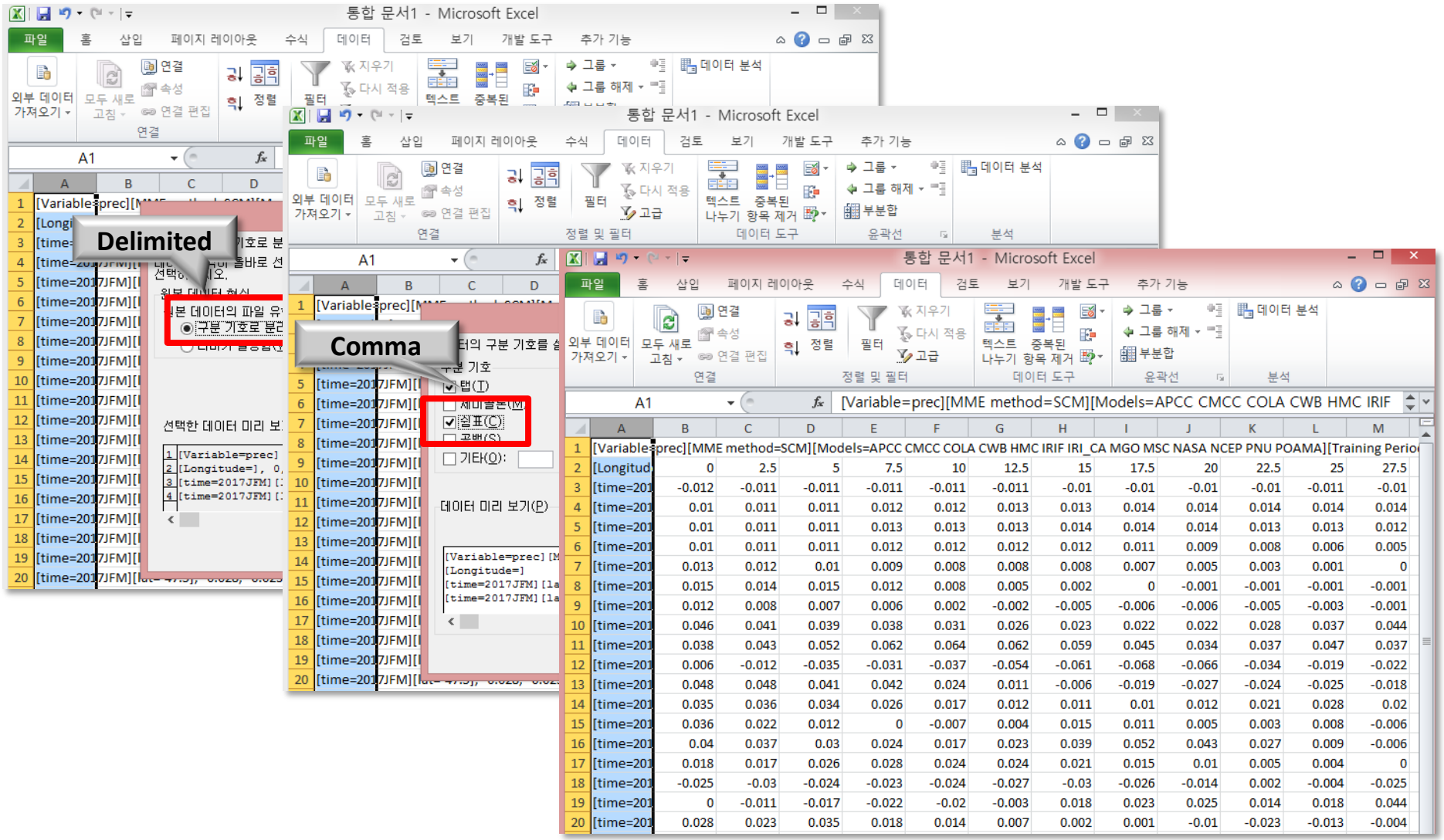

Thank you!

Get annoyed with scrolling up and down?

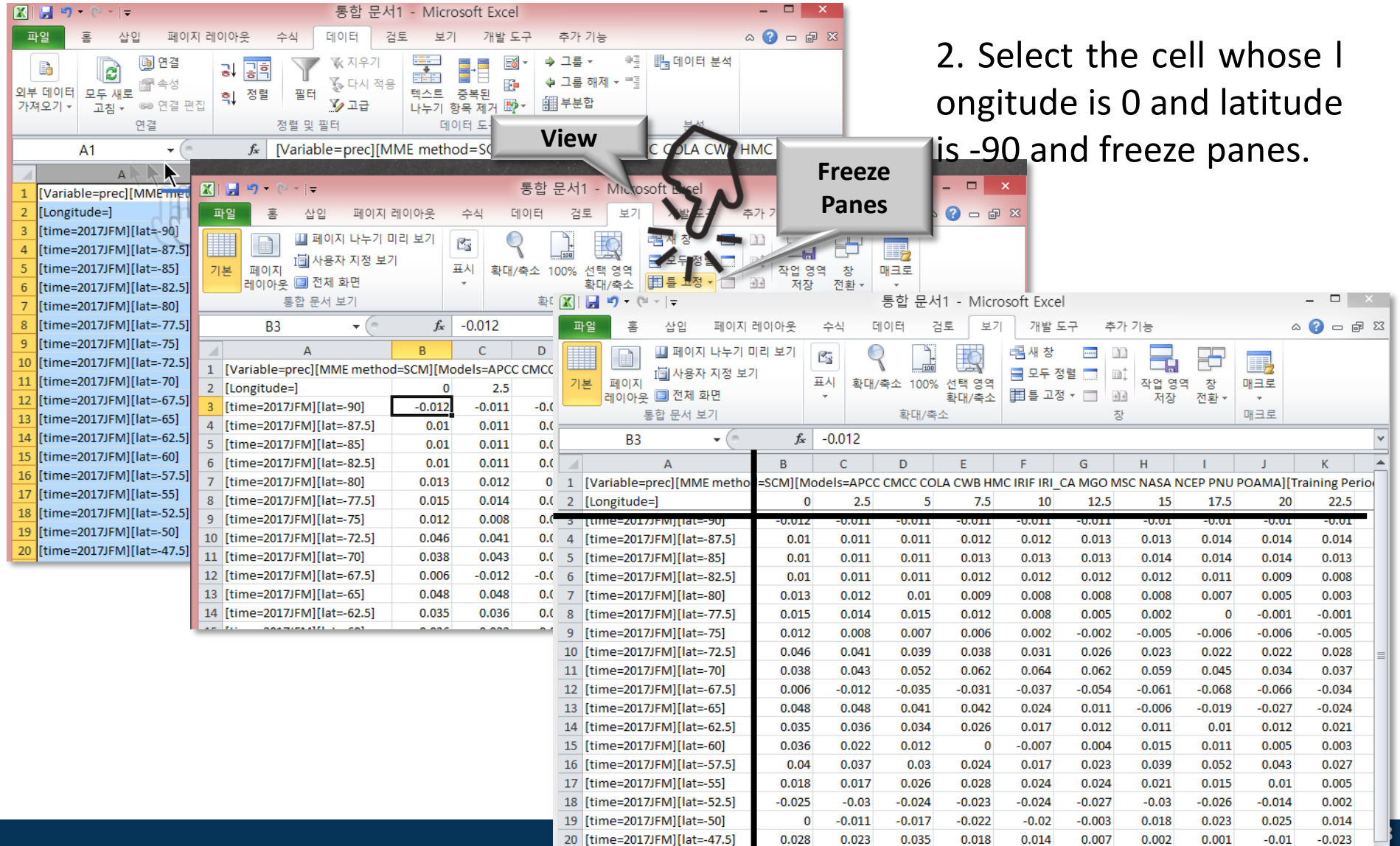


1. Delimit data from text to columns.

Get annoyed with scrolling up and down?



Get annoyed with scrolling up and down?



2. Select the cell whose l ongitude is 0 and latitude is -90 and freeze panes.

lev 4?

Naypyidaw	AN lev1	NN lev2	BN lev3	lev4
① ALL	52.026	29.417	18.557	152.026
② NASA+NCEP+PNU	44.849	29.862	25.289	1E+20
③ APCC+POAMA	74.701	15.888	9.412	174.701

lev4 → final tercile category (drawn)

- lev4 >100 : AN with (lev4-100) %
- 0 < lev4 < 100 : NN with lev4 %
- lev4 <0 : BN with (-1)*lev4%
- lev4 = 1E+20 : eq. chance (IDK)