Madrigal Stats

Mad_Stats.py is the start of statistically analyzing Madrigal TEC EIA results
It works very similar to Swarm_Stats.py, but it is less comprehensive right now

In [4]:
```
import pandas as pd
from Mad_Stats import states_report_mad,  Mad_LSS_plot
```

Mad_Stats.states_report_mad

Report States for date range for Swarm comparison,
need to make one for Madrigal comparison

Required Parameters

> date_range : pandas daterange
>
> > Date range of desired states files
>
> daily_dir : str
>
> > directory of daily files

Key Word Arguemnts

> typ: str
>
> > desired type to check against
> > for orientation of 'state'
> > 'eia'(default), 'peak', 'flat', 'trough'
> > for orientation of 'direction'
> > 'north', 'south', 'neither'
>
> mad_lon : int
>
> > starting longitude for Madrigal Daily Files

Returns

Ni : DataFrame

> NIMO states, directions, and types
> also includes longitude and local times

Mad : DataFrame

> Madrigal States, direction, and types
> also includes longitude and local times

In [9]:
```
date_range = pd.date_range(start='2014-01-01',  end='2014-01-31')

date_array = date_range.to_pydatetime()
sday = date_array[0]
daily_files = '~/Type_Files/Daily'

NiMad, Mad = states_report_mad(date_range, daily_files, typ='eia', mad
NiMad
```

Out[9]:

	state	direction	type	GLon	LT	skill
0	peak	neither	peak	-76.0	18.666667	M
1	peak	neither	peak	-72.0	19.000000	C
2	peak	neither	peak	-68.0	19.333333	C
3	peak	south	peak_south	-64.0	19.666667	M
4	eia	south	eia_saddle_peak_south	-56.0	20.000000	F
...	...	...	...	...	...	...
16760	eia	neither	eia_saddle_peak	-76.0	18.416667	F
16761	eia	south	eia_saddle_peak_south	-72.0	18.750000	F
16762	eia	south	eia_saddle_peak_south	-68.0	19.083333	H
16763	eia	south	eia_saddle_peak_south	-64.0	19.416667	F
16764	eia	south	eia_south	-52.0	20.083333	H

16765 rows × 6 columns

Mad_Stats.Mad_LSS_plot

Plot LSS vs CSI or PC 4 panels (one for each LSS) for 1 model alone
NOTE: LSS is only useful in comparison to another model; therefore, coin set to True is highly recommended!

Required Parameters

> model1 : dataframe

> > model dataframe built by states_report_swarm
>
> eia_type : str
>
> > desired eia type for fig title
>
> date_range : datetime range
>
> > For plotting title purposes

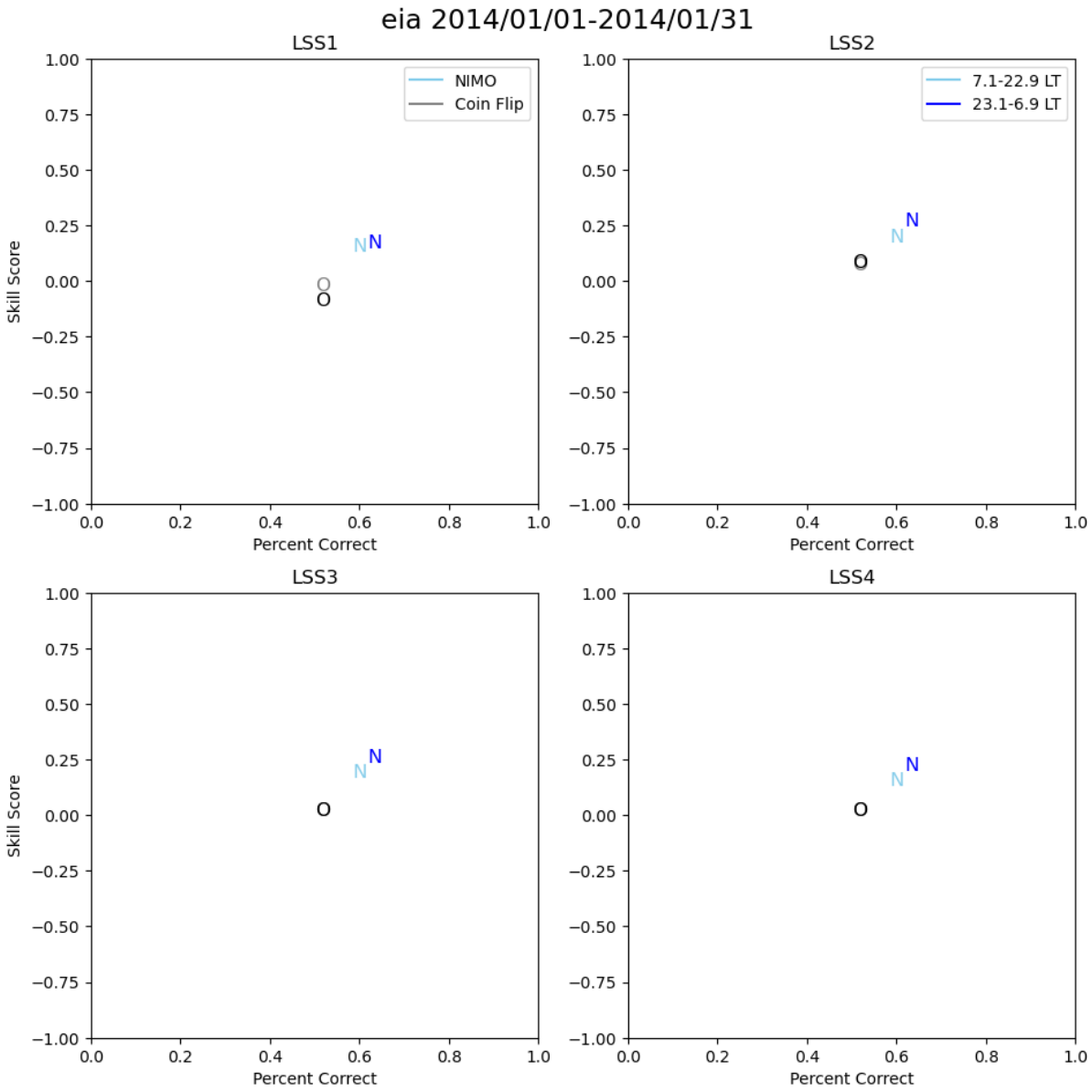
Key Word Arguments

> model_name : str kwarg
>
> > first model name for labelling purposes
>
> PorC : str kwarg
>
> > Percent correct or Critical success index for x axes
>
> DayNight : bool kwarg
>
> > True (default) if panels should have separate markers
> > for day and night
> > otherwise (false) all are plotted together
>
> LT_range : list kwarg
>
> > Range of day night local time, Default is 7 LT to 19 LT
> > for day and
> > 19 LT to 7 LT for Night
>
> coin : bool kwarg
>
> > If True, coin LSS will be plotted for comparison
> > (default)
> > if false, coin LSS will not be plotted

Returns

> fig : fig handle
>
> > 4 panel figure (one for each LSS)

In [10]:
```
fig = Mad_LSS_plot(NiMad, 'eia', date_range, model_name='NIMO',
                                PorC='PC', DayNight=True, LT_range=[7, 23
                                coin=True)
```


eia 2014/01/01-2014/01/31
LSS1
LSS2
LSS3
LSS4
NIMO
Coin Flip
7.1-22.9 LT
23.1-6.9 LT
Skill Score
Percent Correct
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
0.0
0.2
0.4
0.6
0.8
1.0

In [ ]: