Science_Flight_20151213

December 13, 2015

In this report, we'll review the science flight of the ER-2 starting on 12/13/2015. This was a ~7-h flight that sampled post-frontal convection. First, let's import all the needed modules and ingest and process the raw data.

In [1]:
```
from __future__ import print_function
import numpy as np
import matplotlib.pyplot as plt
import datetime as dt
import os
import glob
import pyart
import rawpyampr
import pyampr
import dualpol
from copy import deepcopy
from IPython.display import Image
from awot.graph.common import create_basemap
from awot.graph.flight_level import FlightLevel
from pyart_tools import (
    plot_list_of_fields, list_nexrad_files, read_nexrad_aws)
%matplotlib inline
```

In [2]:
```
import warnings
warnings.filterwarnings('ignore')
def delete_file(fname):
    try:
        os.remove(fname)
    except:
        pass
```

In [3]:
```
datadir = './'
files = glob.glob(datadir + '*.dat')
print(files)
fname = os.path.basename(files[0])[:-4]
```

```
['./AMPR-20151213-130135.dat', './AMPR-20151213-132104.dat', './AMPR-20151213-154353.dat', './AMPR-2015
```

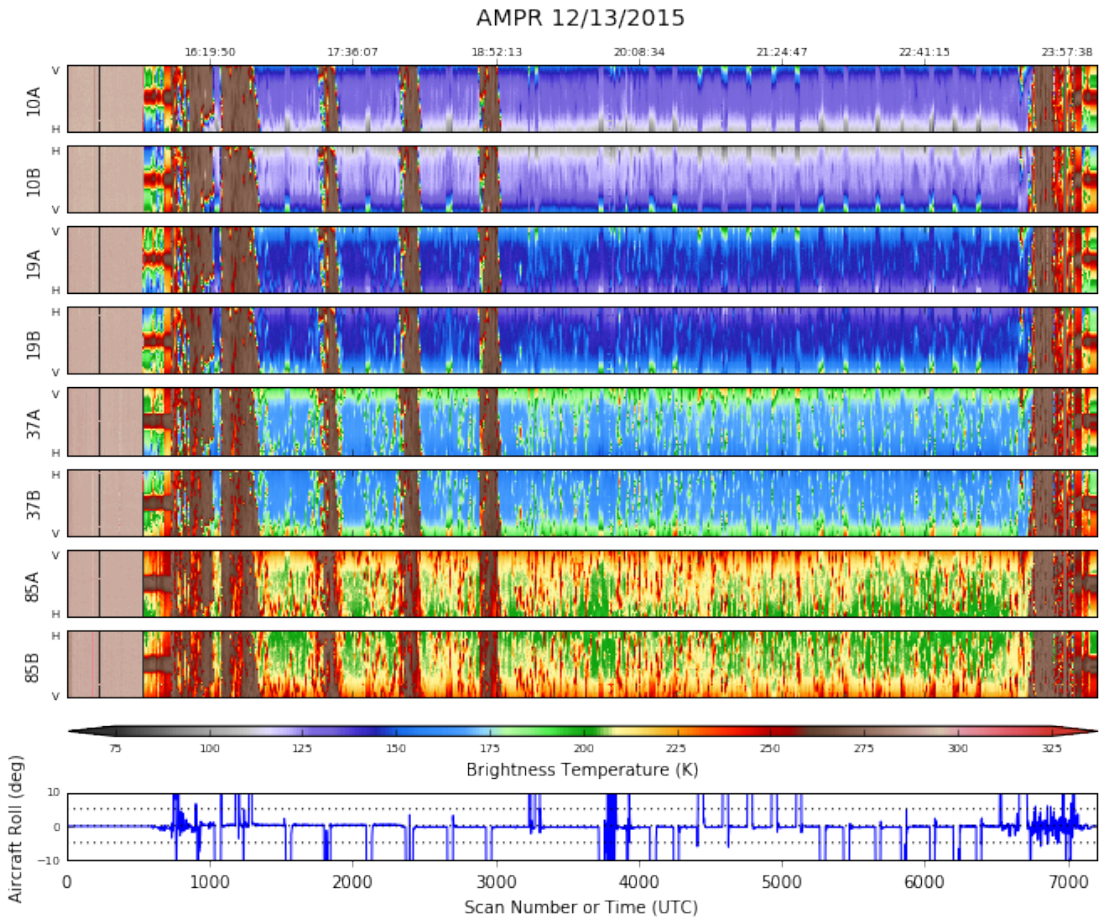
In [4]:
```
payload = rawpyampr.ampr_payload.AMPR_Payload(files)
l1file = fname + '_L1.nc'
l2file = fname + '_L2.nc'
delete_file(l1file)
payload.writeLevel1B(l1file)
L1B = rawpyampr.ampr_level1b.AMPR_QC(l1file)
delete_file(l2file)
L1B.writeLevel2B(l2file)
```

```
All of file: ./AMPR-20151213-130135.dat Read Successfully
End of data stream reached
All of file: ./AMPR-20151213-132104.dat Read Successfully
End of data stream reached
All of file: ./AMPR-20151213-154353.dat Read Successfully
End of data stream reached
All of file: ./AMPR-20151213-201318.dat Read Successfully
End of data stream reached
Interpreting Navigation Records as: IWG1
 No navigation file found
Navigating pixels using internal recording of nav data.
Number points to converge: 4
Writing to output file:  AMPR-20151213-130135_L1.nc
Found Navigation Data!
Writing to output file: AMPR-20151213-130135_L2.nc
File containing water fraction not on path
```

Now we are ready to read in and display the L2 geolocated brightness temperatures.

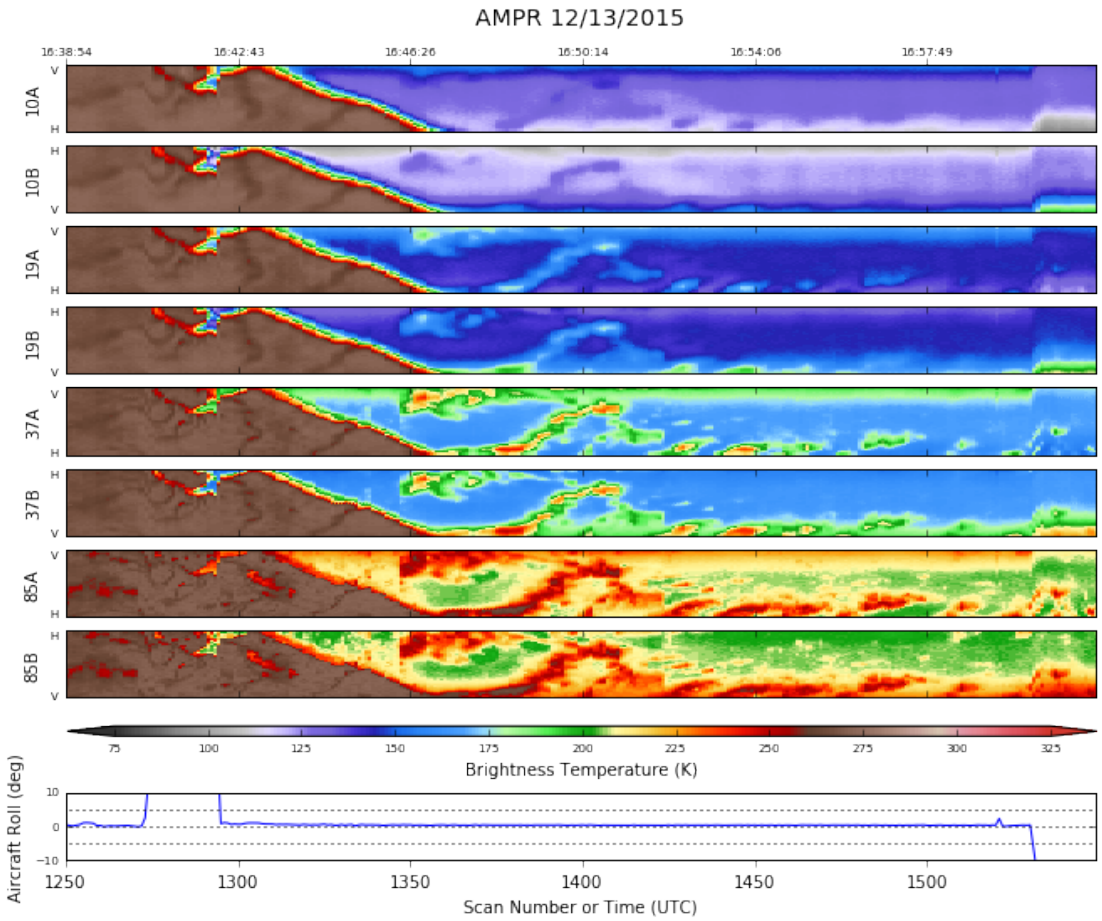
```
In [5]: data = pyampr.AmprTb(l2file)
        data.plot_ampr_channels()
```

```
********************
read_ampr_tb_level2b(): Reading AMPR-20151213-130135_L2.nc
Assuming OLYMPEX data structure.
Change to proper project if incorrect, otherwise errors will occur.
Currently available field projects: OLYMPEX, IPHEX, MC3E, TC4, TCSP, JAX90, COARE,
CAMEX1, CAMEX2, CAMEX3, CAMEX4, TRMMLBA, KWAJEX, TEFLUNA, FIRE3ACE, CAPE
Default: project = 'OLYMPEX'
Found Navigation Data!
(7202,)
********************


********************
plot_ampr_channels():
Available scans = 1 to 7202
Available times = 13:01:39 - 00:12:59
********************
```

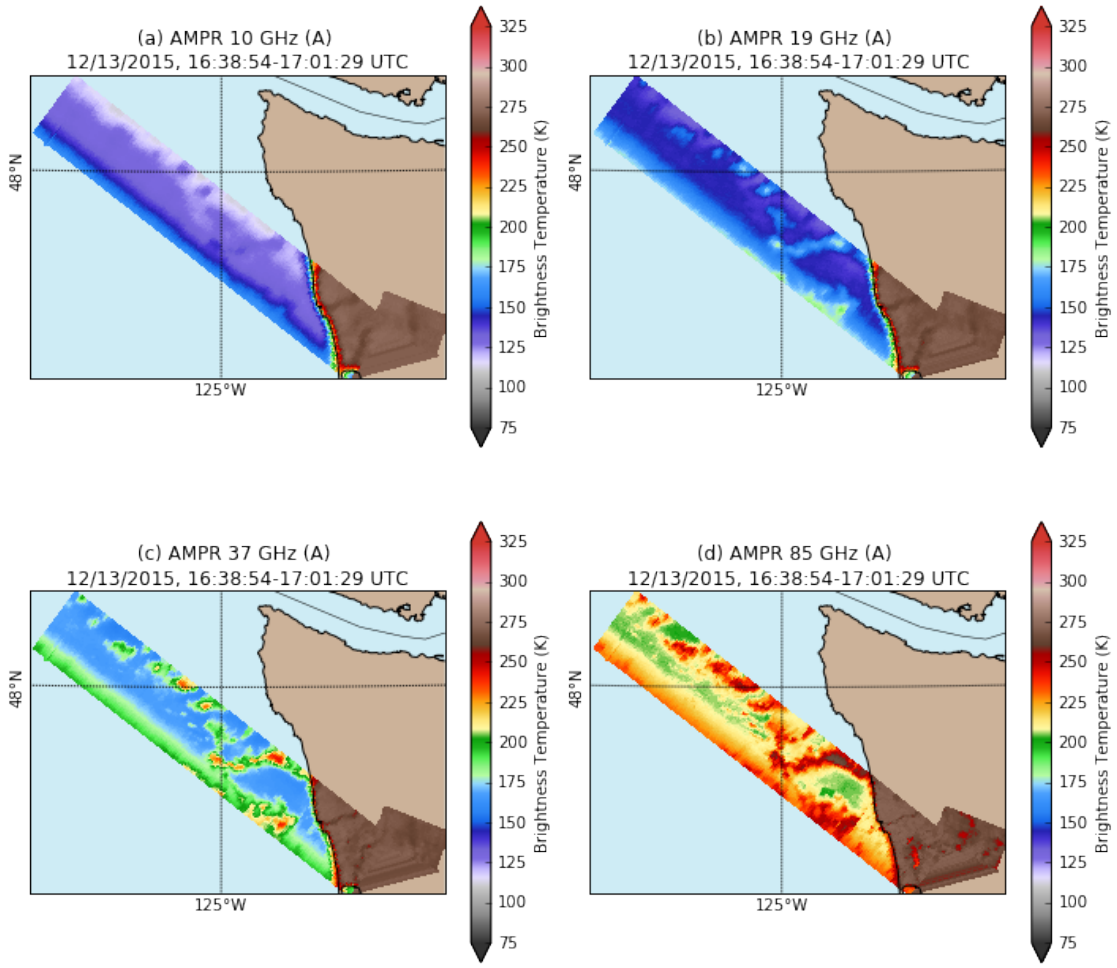


The early part of the chart consists of engineering test data, which is why the channels look so uniform before the flight. Otherwise, there was just a lot over overflights of scattered convection. The first portion of the flight was close to shore. Let's examine a portion of that.

```
In [6]: data.plot_ampr_channels(scanrange=(1250, 1550))

********************
plot_ampr_channels():
Available scans = 1 to 7202
Available times = 13:01:39 - 00:12:59
********************
```

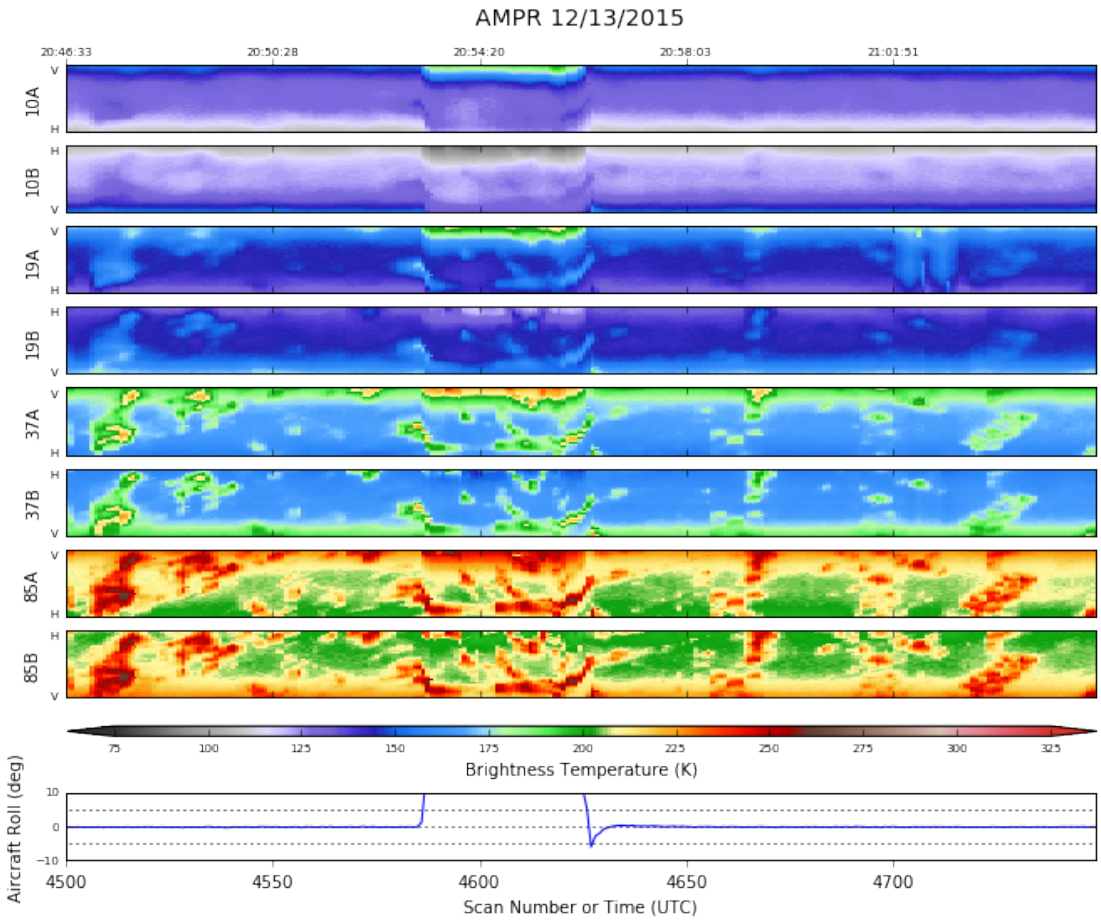



```
In [13]: output = data.plot_ampr_track_4panel(
             scanrange=(1250, 1550), maneuver=False, resolution='h',
             return_flag=True)
```

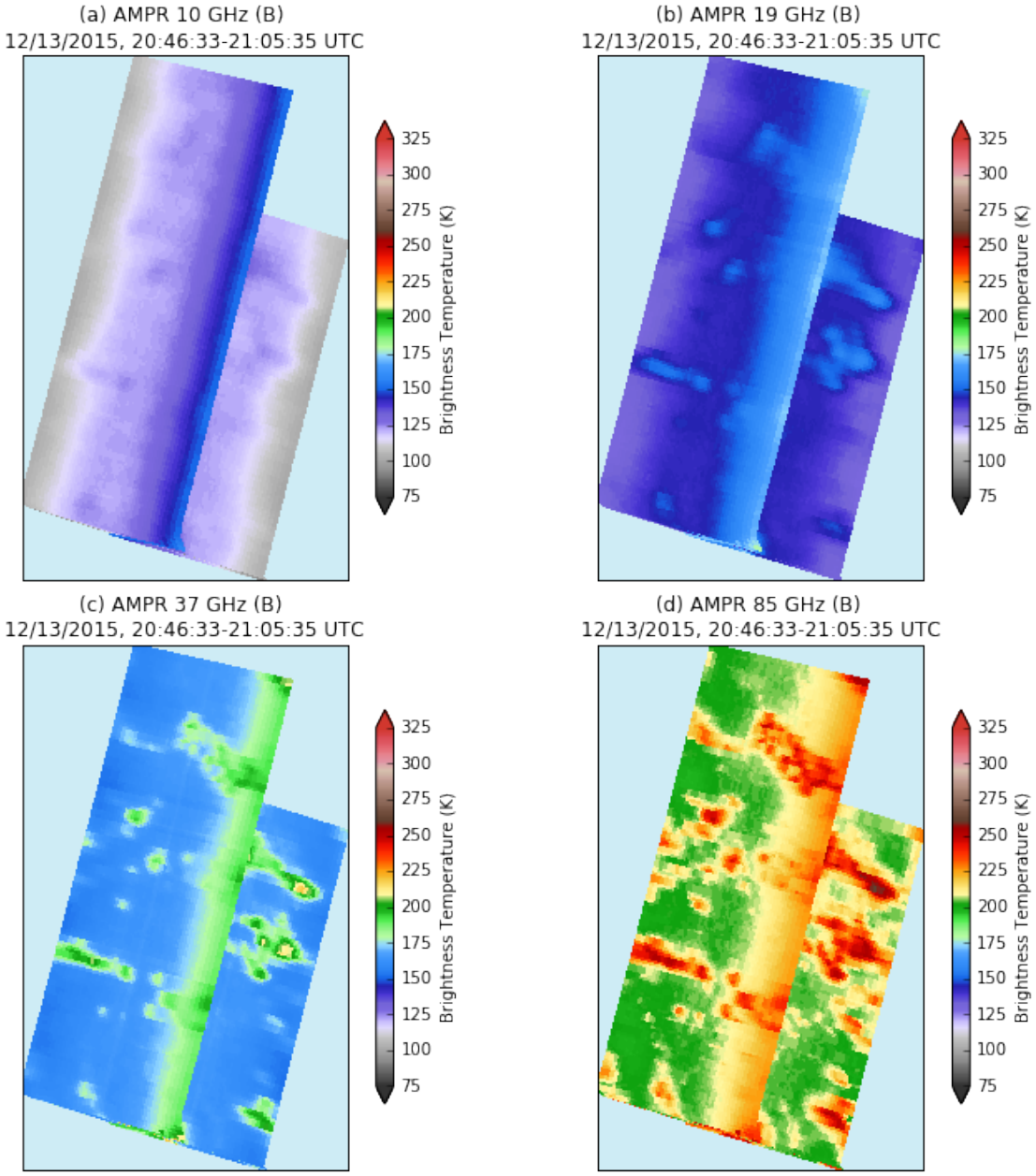


This convection shows up on all frequencies. By the way, after the questions from last flight, 85 GHz looked great today. After these initial flights close to shore, the ER-2 did multiple orbits far offshore over small convective clouds. Hours of that was done. Let's check out just a small portion to capture the essential flavor.

```
In [14]: data.plot_ampr_channels(scanrange=(4500, 4750))

********************
plot_ampr_channels():
Available scans = 1 to 7202
Available times = 13:01:39 - 00:12:59
********************
```

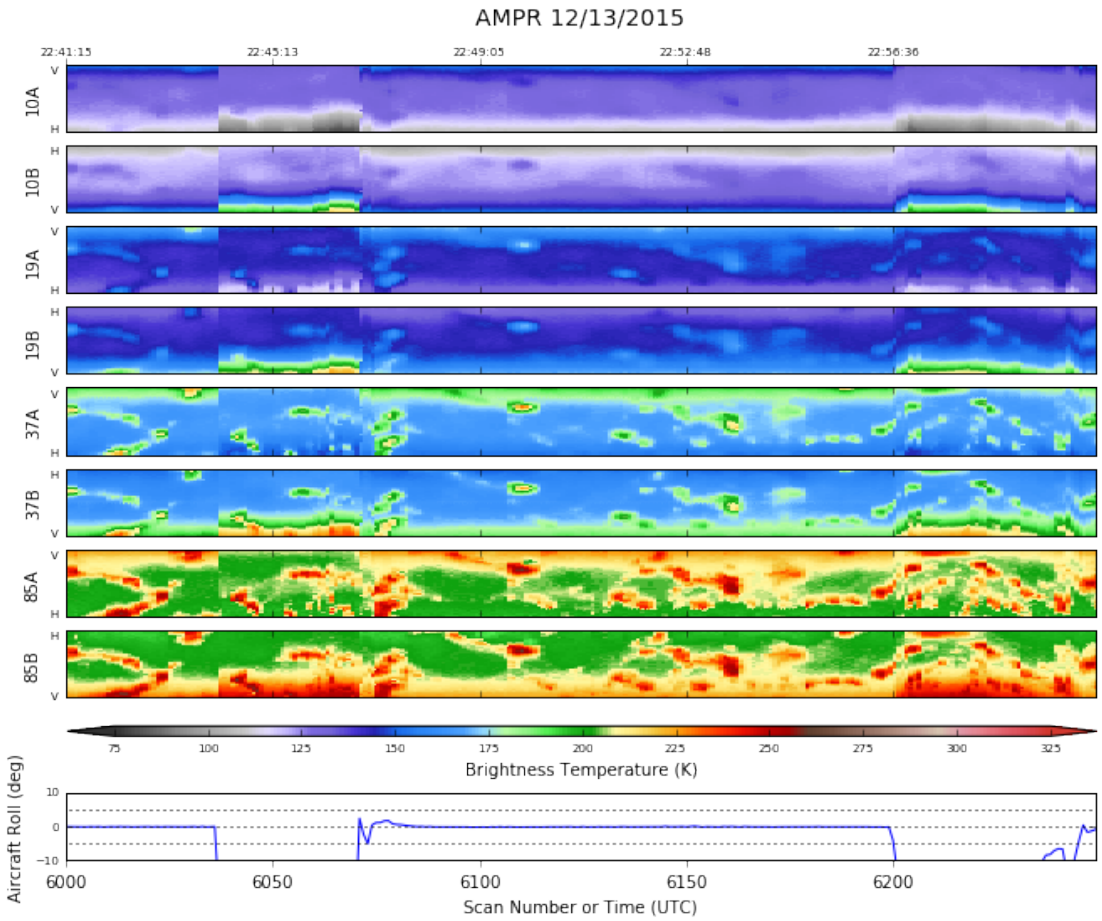



```
In [12]: output = data.plot_ampr_track_4panel(
             chan='b', scanrange=(4500, 4750), maneuver=False, resolution='l',
             return_flag=True)
```

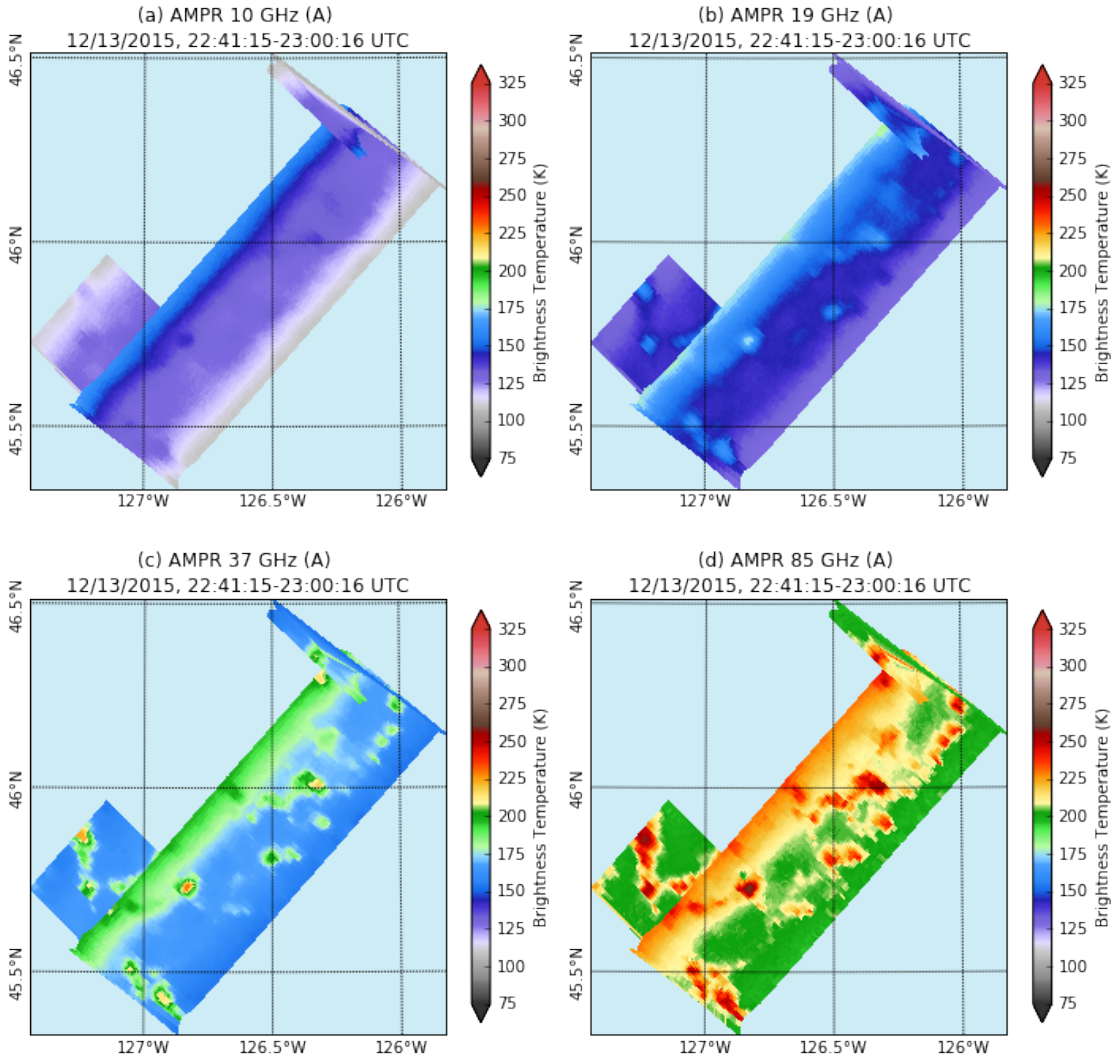


Some of these clouds featured emission signatures at all frequencies. Overall, AMPR data quality looks really great from this day. Hours of good data on RADEX's priority of post-frontal convection. Seriously, let's take another look 1.5+ h later . . .

```
In [18]: data.plot_ampr_channels(scanrange=(6000, 6250))

********************
plot_ampr_channels():
Available scans = 1 to 7202
Available times = 13:01:39 - 00:12:59
********************
```




```
In [20]: output = data.plot_ampr_track_4panel(
             chan='a', scanrange=(6000, 6250), maneuver=False, resolution='l',
             return_flag=True, meridians=0.5, parallels=0.5)
```



So many small convective cells from which to choose!

In [ ]:

In [ ]:

In [ ]: