

Ferry_Flight_20151215

February 22, 2016

In this report, we'll review the ferry flight of the ER-2 on 12/15/2015. This was a ~3-h flight that went from McChord AFB to Palmdale. There was little science opportunity on this flight, but the aircraft did fly over open ocean for a while. 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 os
import glob
import rawpyampr
import pyampr
%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-20151215-164825.dat']
```

```
In [4]: payload = rawpyampr.ampr_payload.AMPR_Payload(files[0])
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-20151215-164825.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-20151215-164825_L1.nc
```

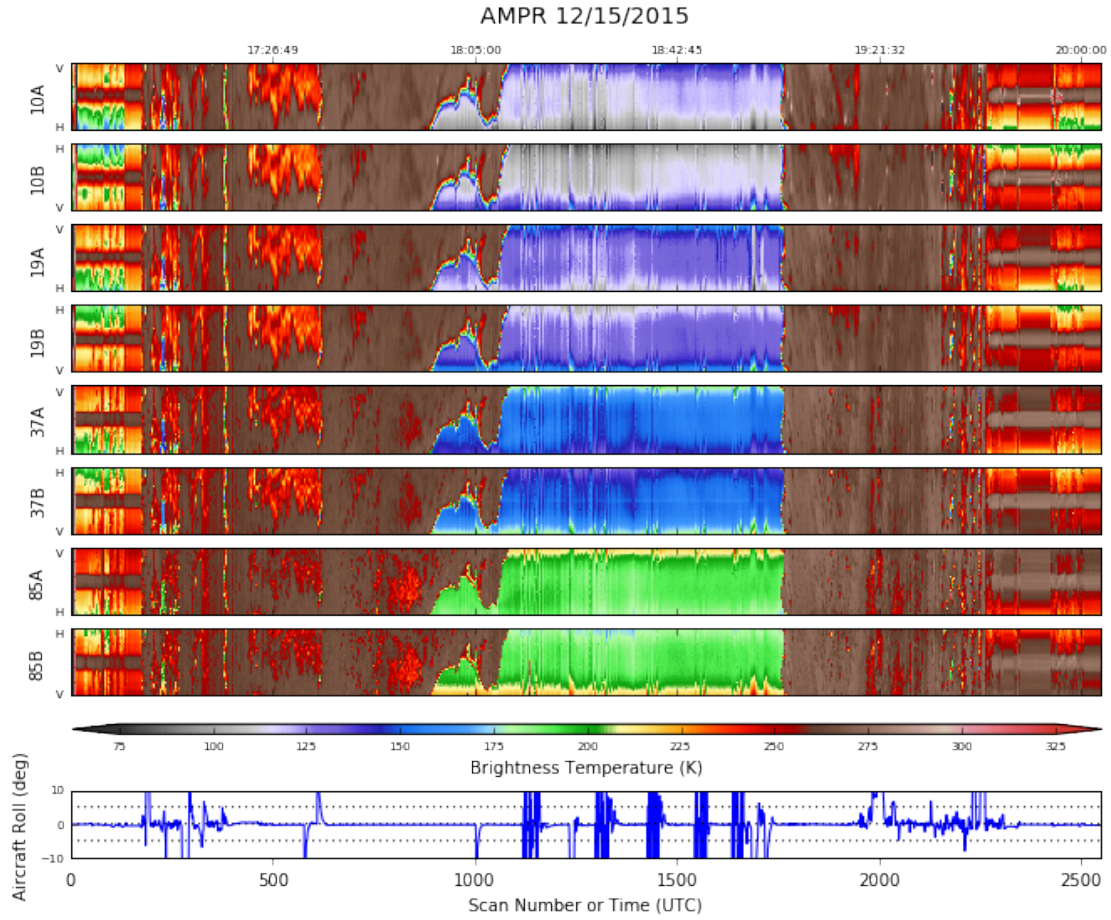
```
Found Navigation Data!  
Writing to output file: AMPR-20151215-164825_L2.nc  
File containing water fraction not on path
```

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-20151215-164825_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!  
(2548,)  
*****
```

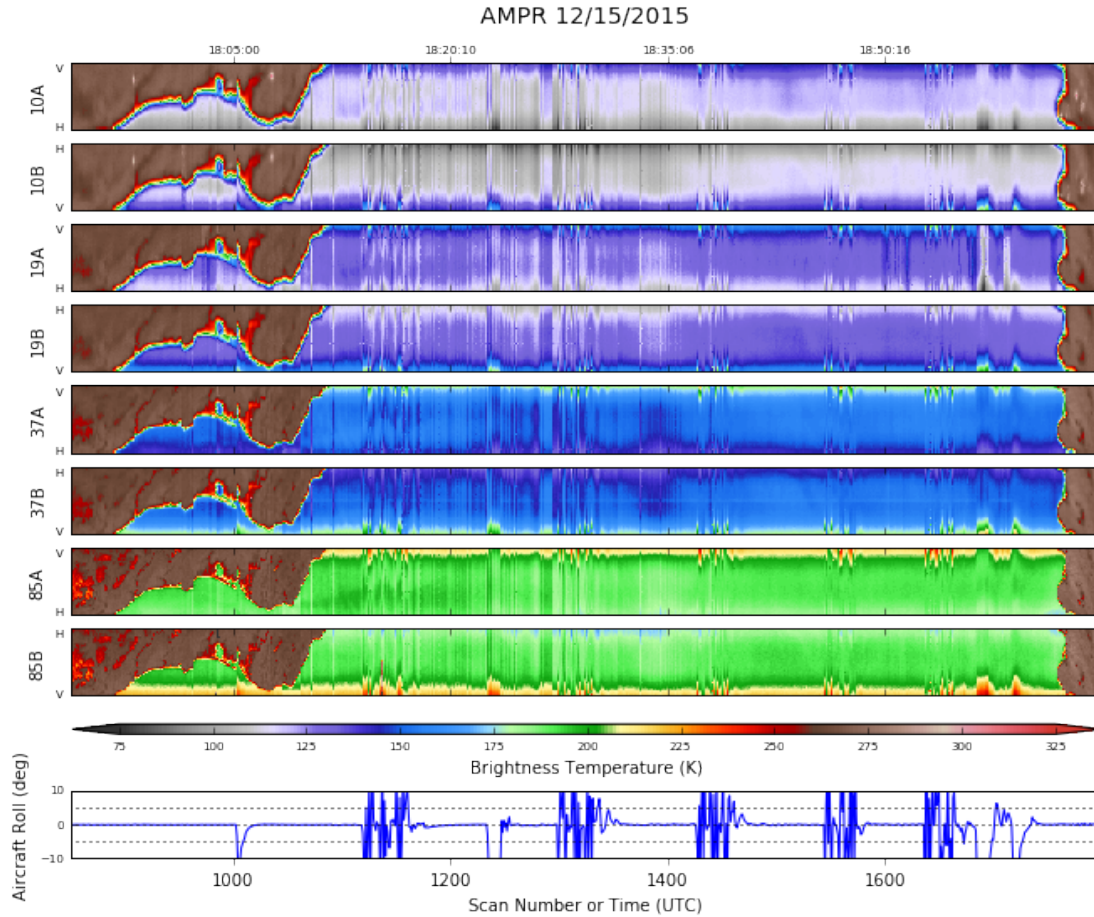
```
*****  
plot_ampr_channels():  
Available scans = 1 to 2548  
Available times = 16:48:29 - 20:03:37  
*****
```



Overall, this looks pretty good. No notable outages, even short-lived ones. The middle portion of the flight is mostly over water. Let's take a closer look at it.

```
In [10]: data.plot_ampr_channels(scanrange=[850, 1800])
```

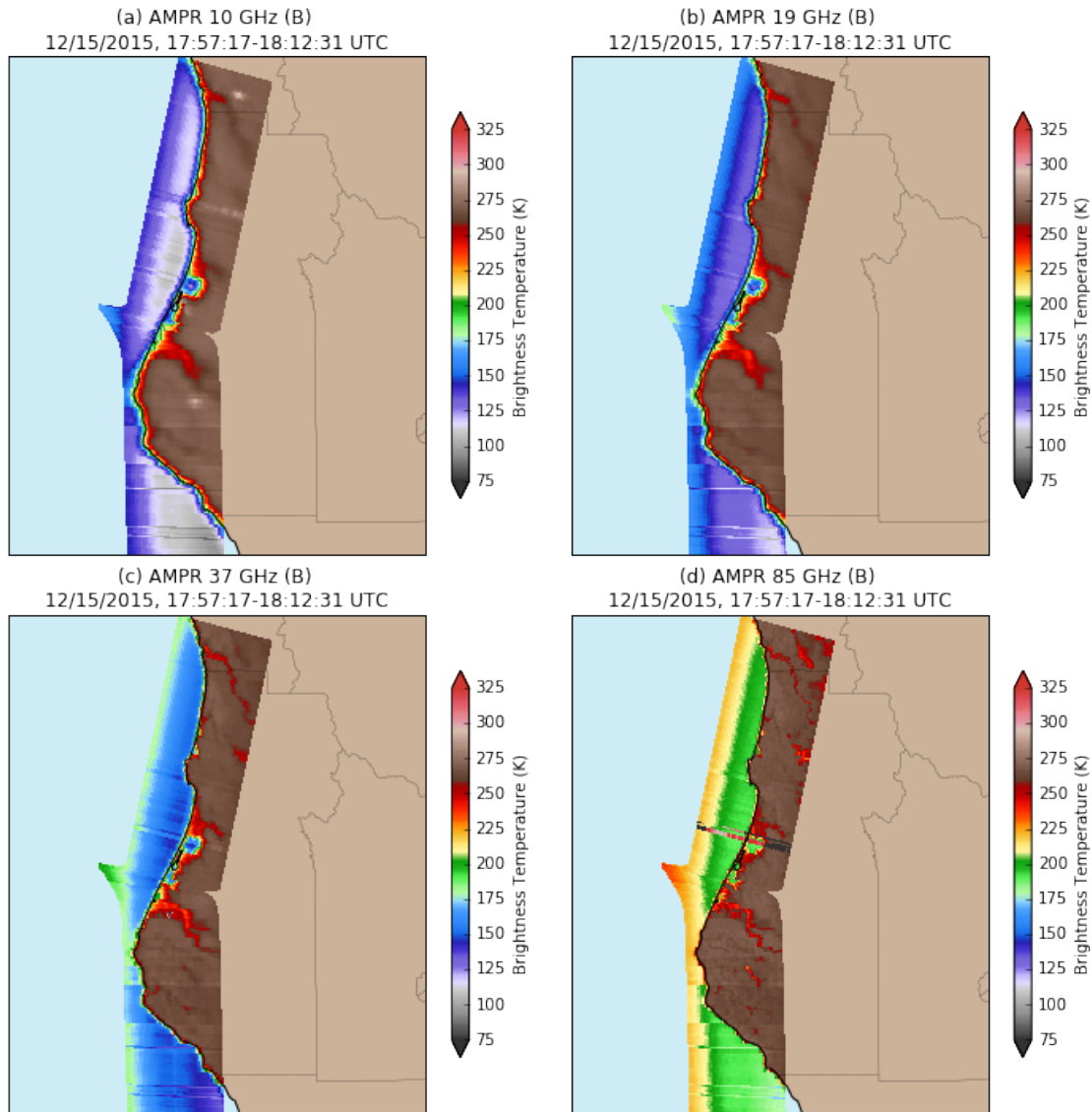
```
*****
plot_ampr_channels():
Available scans = 1 to 2548
Available times = 16:48:29 - 20:03:37
*****
```



HIWRAP's surface reflection is really obvious at 37 GHz (B). The ER-2 starts to go out to sea around Humboldt County in California. Let's take a look at how AMPR maps the coastline during that time.

```
In [24]: output = data.plot_ampr_track_4panel(
    chan='b', scanrange=[900, 1100], maneuver=True, resolution='h',
    return_flag=True, lonrange=[-125, -123], show_grid=False)
output.basemap.drawcounties(ax=output.ax1)
output.basemap.drawcounties(ax=output.ax2)
output.basemap.drawcounties(ax=output.ax3)
output.basemap.drawcounties(ax=output.ax4)
```

```
Out[24]: <matplotlib.collections.LineCollection at 0x121c181d0>
```

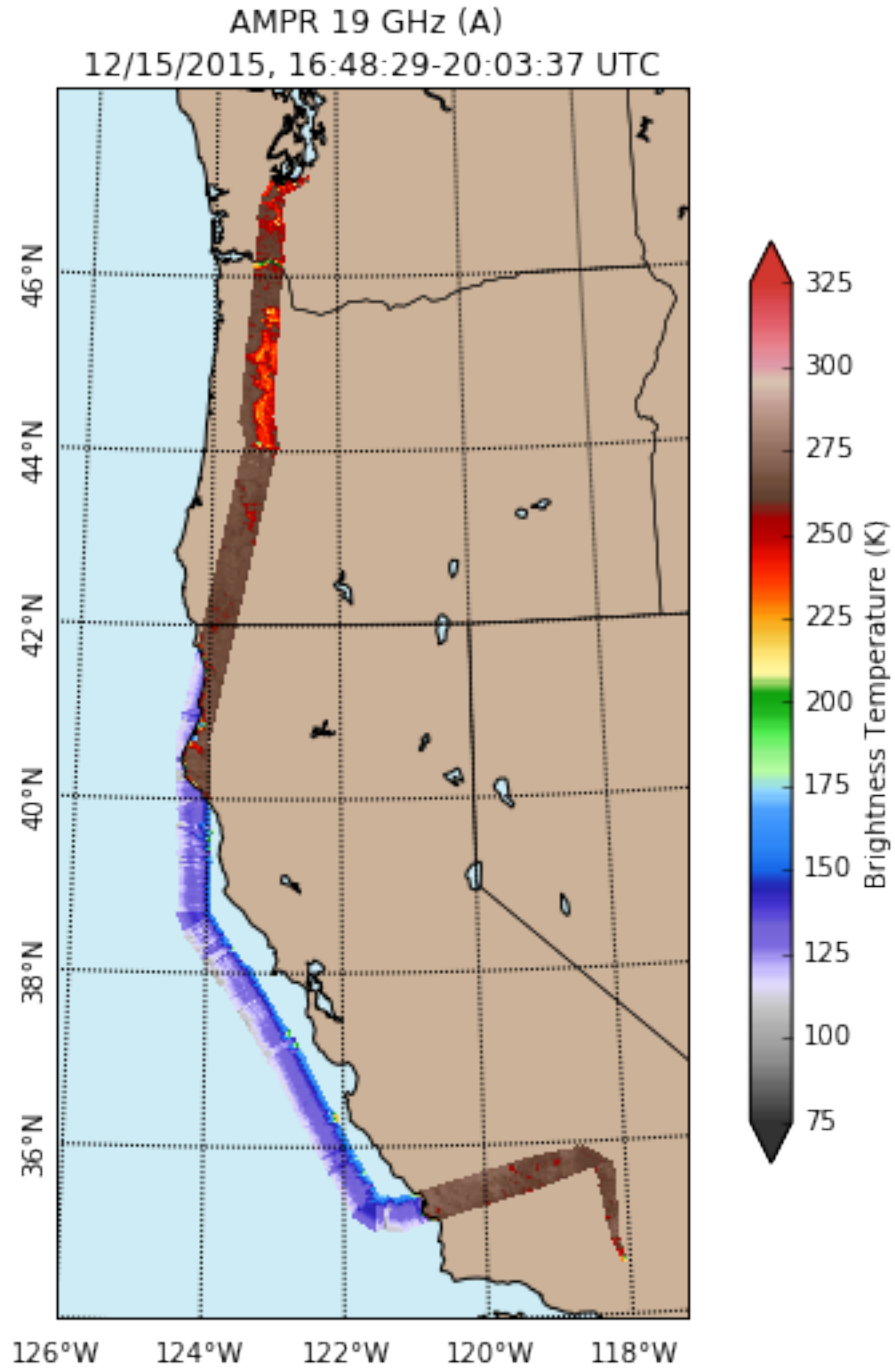


Arcata and Humboldt Bays, plus the Eel River, all show up nicely and are well mapped at the higher resolution frequencies like 85 GHz. There is a slight data blip in the 85 GHz (B) channel, and then once the ER-2 starts going out to sea south of Humboldt County it performs a series of roll maneuvers. These are for HIWRAP.

Now for fun, let's show the entire flight track, from WA to CA.

```
In [25]: stuff = data.plot_ampr_track(
    '19a', maneuver=False, meridians=2, parallels=2,
    resolution='i', lonrange=[-126, -116],
    latrange=[34, 48], return_flag=True)
stuff[2].fillcontinents(color='#CCB299', lake_color='#CEECF5',
    ax=stuff[1], zorder=0)
stuff[2].drawmapboundary(fill_color='#CEECF5', ax=stuff[1])
```

Out[25]: <matplotlib.patches.Rectangle at 0x1251ef110>



And that's it for AMPR's role in OLYMPEX!

In []: