LagrantoNotes

October 11, 2019

0.0.1 Notes

1. Script runLagranto runs lagranto backwards.

2. To create a start file, use create_startf. Here, startf is created from a region. The region is defined in regionf. Syntax is region.eq(2,30) @ profile(100,80,15) @hPa,agl. 30 is the step-size in km. The syntax for create_startf is time filename.
3. Trajectories are determined using caltra
4. Tracing meteorological variables is done with trace. The actual variables are specified in tracevars. Syntax is

Trace definition format

var	scale	calculate?	file type
PS	1.	0	P
Q	1000.	0	P

Code is located in directory /home/grecu/lagranto/lagranto.ecmwf/cdo

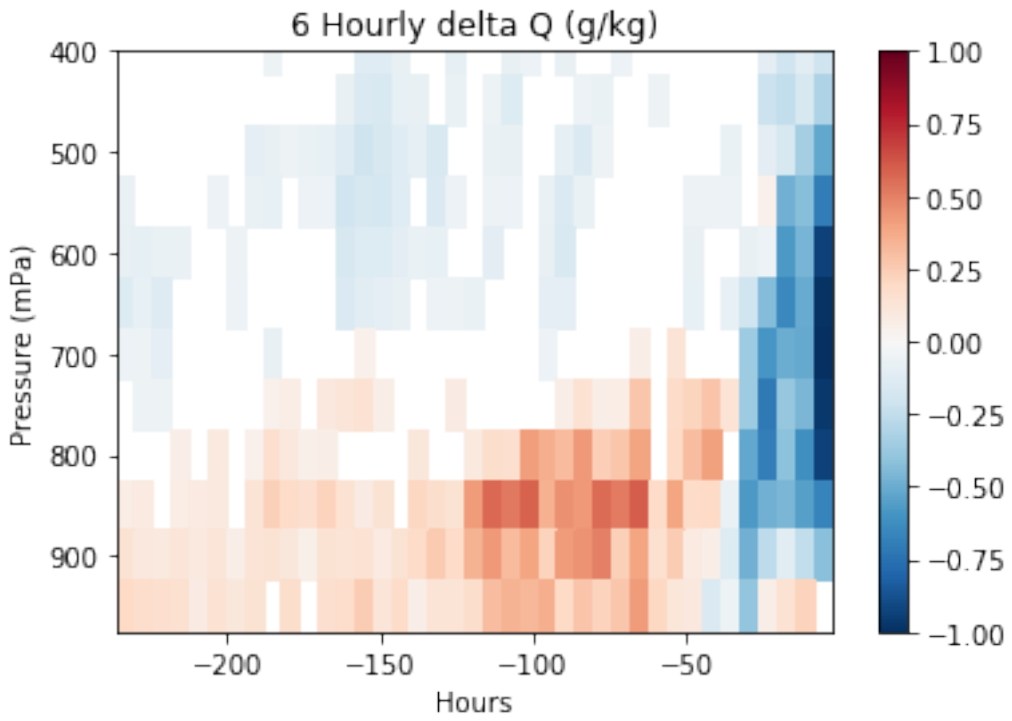
[1]:
```
import os
os.environ['LAGRANTO']='/home/grecu/lagranto/lagranto.ecmwf'
os.environ['LD_LIBRARY_PATH']='/home/grecu/netcdf3/lib'

cmd='../bin/create_startf 20151202_12 startf_20151202_12 "region.eqd(2,30) @␣
 ↪profile(100,800,15) @hPa,agl"'
os.system(cmd)
cmd='../bin/caltra 20151202_12 20151122_12 startf_20151202_12 traj2b.4   -o 360␣
 ↪-j'
```

[ ]:
```
%matplotlib inline
import matplotlib.pyplot as plt

from netCDF4 import Dataset
from mpl_toolkits.basemap import Basemap, cm
import numpy as np


f=Dataset('traj2b.4','r')
```

```
x=f['lon'][:,:,:]
y=f['lat'][:,:,:]
p=f['p'][:,:,:]
q=f['Q'][:,:,:]
import glob
files=sorted(glob.glob("P2015*"))[0:42]
import sys
sys.path.append("/home/grecu/lagranto/lagranto.ecmwf/cdo")

from numpy import *
a=nonzero(p[0,0,0,:]-p[1,0,0,:]<-30)
b=nonzero(p[4,0,0,:][a]>100)
c=nonzero(p[20,0,0,:][a][b]>100)

dqdt=zeros((40,20),float)
count=zeros((40,20),float)
for i in a[0][b][c]:
    for j in range(40):
        ip=int(((p[j:j+2,0,0,i]).mean()-50)/50.)
        if ip>=0 and ip<20:
            dqdt[j,ip]+=(q[j,0,0,i]-q[j+1,0,0,i])
            count[j,ip]+=1

a=nonzero(count>0)
dqdt[a]=dqdt[a]/count[a]
dqdtm=ma.array(dqdt,mask=abs(dqdt)<0.05)
matplotlib.rcParams.update({'font.size': 20})
```

[5]:
```
plt.pcolormesh(-236+arange(40)*6,25+arange(20)*50,dqdtm[::-1,:].
 ↪T,cmap='RdBu_r',\
               vmin=-1,vmax=1)
plt.ylim(975,400)
plt.xlabel('Hours')
plt.ylabel('Pressure (mPa)')
plt.title('6 Hourly delta Q (g/kg)')
plt.colorbar()
```

[5]:
```
<matplotlib.colorbar.Colorbar at 0x7f86a2b1a5c0>
```


6 Hourly delta Q (g/kg)
Pressure (mPa)
400
500
600
700
800
900
−200
−150
−100
−50
Hours
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00

[ ]: