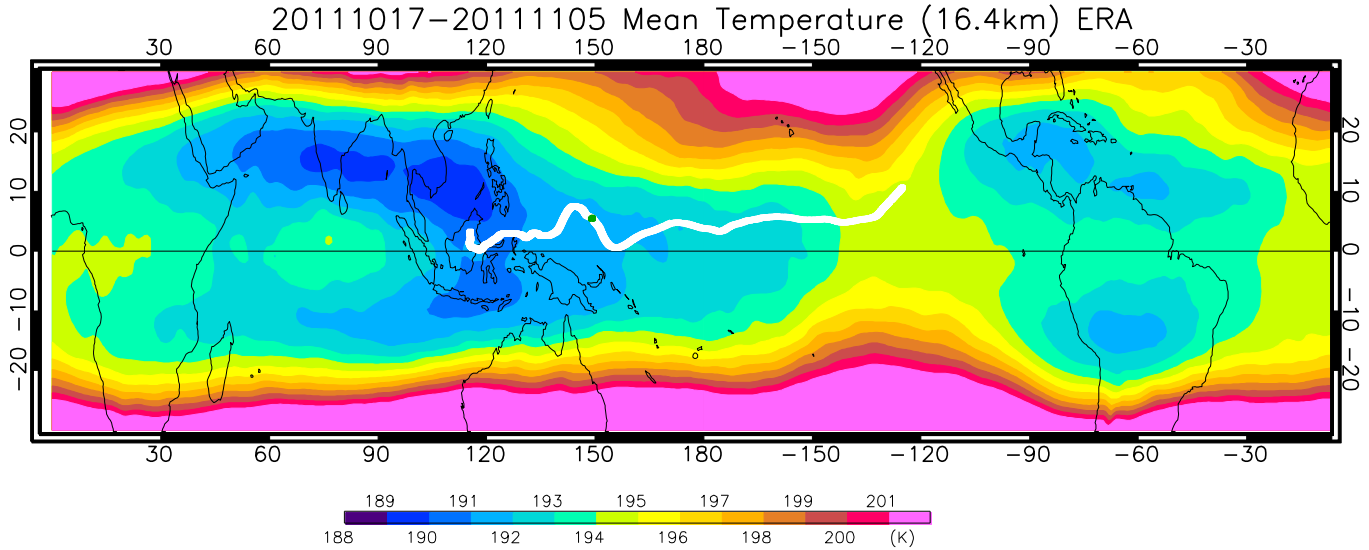
Temperature curtain comparison

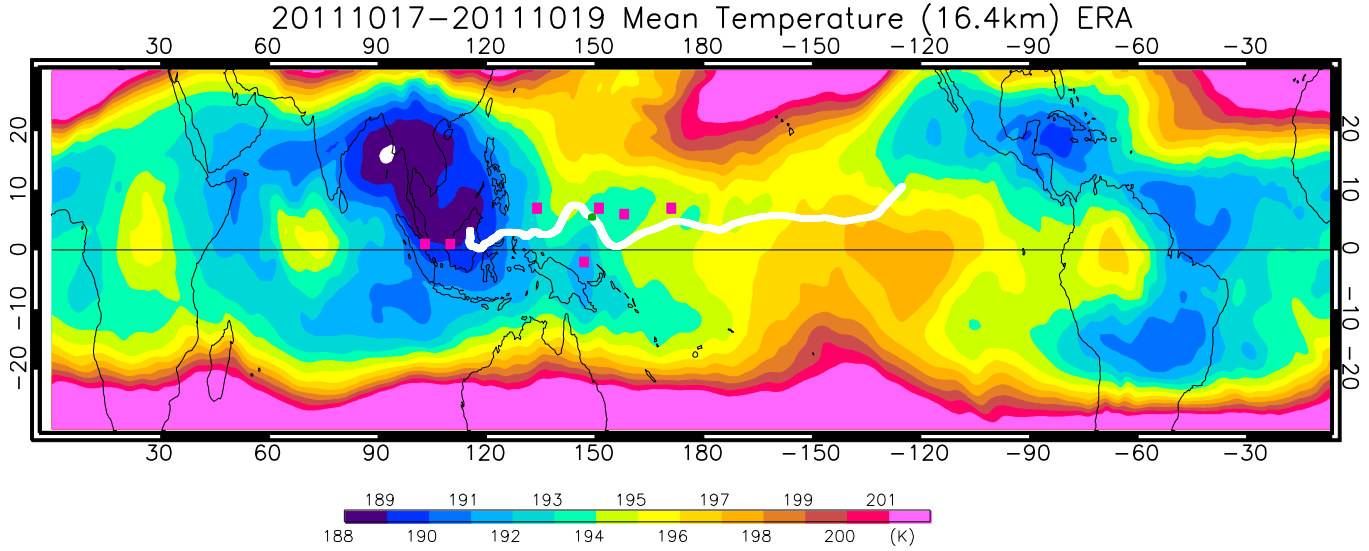
- 20 day back trajectory 2011.10.17-2011.11.05
- Parcel goes eastward forward in time

- COMPARE ..
  - Linear interpolation
  - E1: only wave interpolation (amplitude&phase)
  - E4: wave interpolation + amplification
  - (Linear interp. + Lenny's waves)

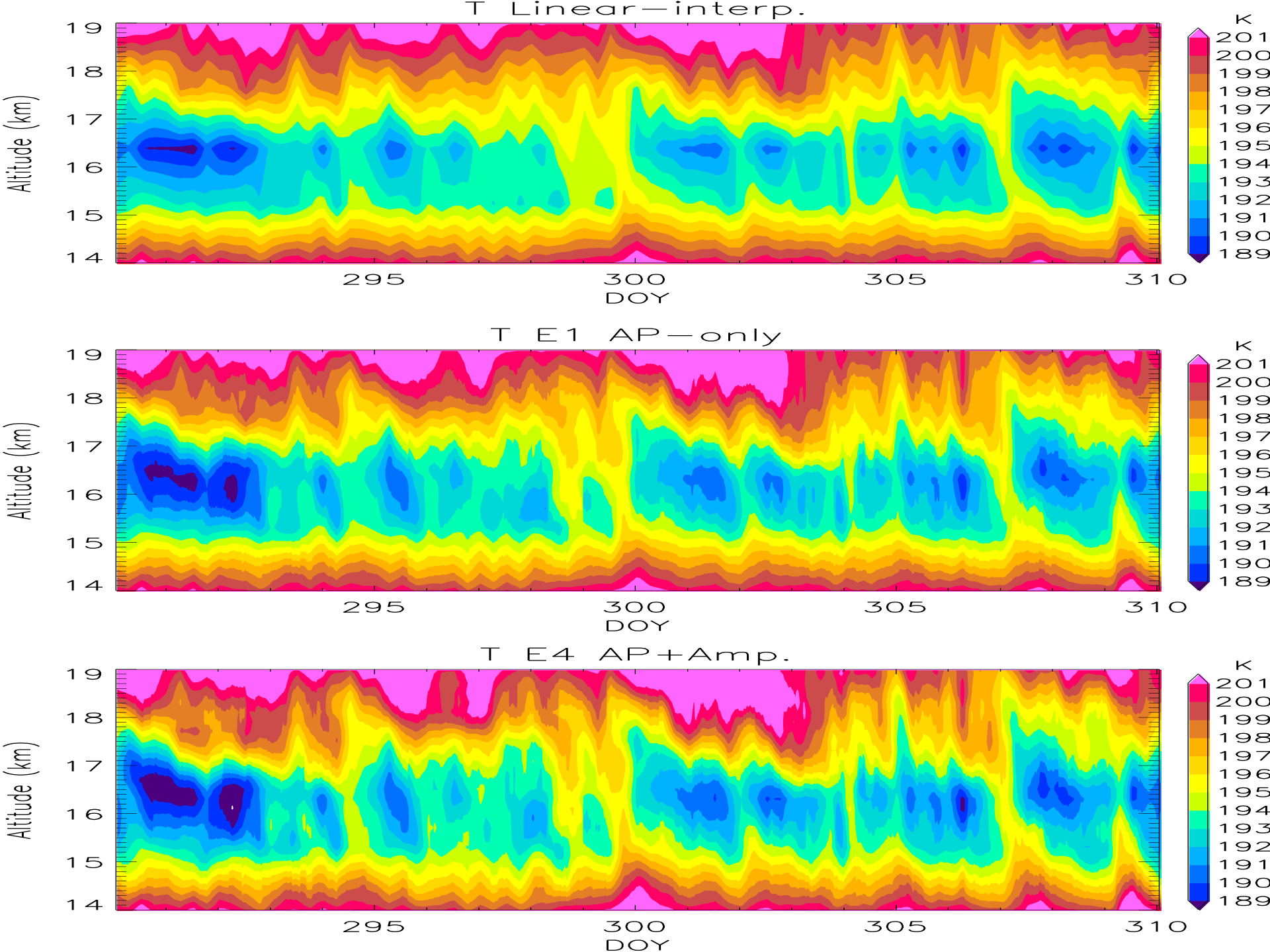
*E1,E4: Sep-Oct-Nov 90 day data were used for FFT
*E4 : Amplified based on W-Pacific DJF statistics

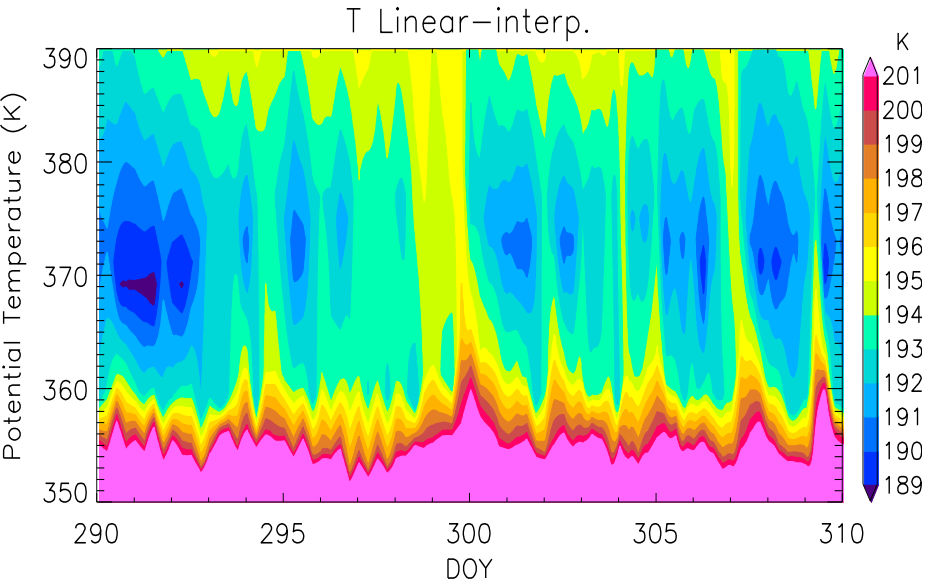


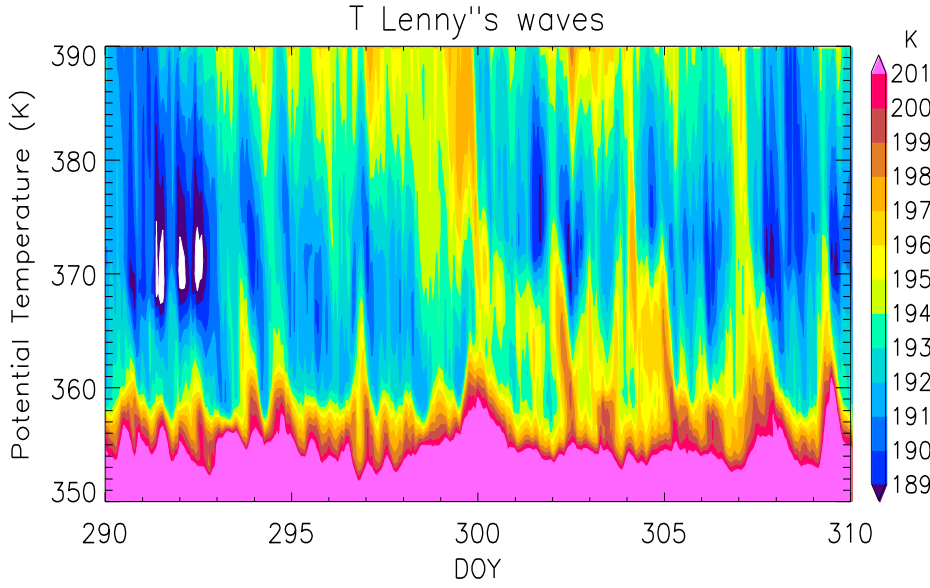
Oct 17-Nov 5:
20 day average

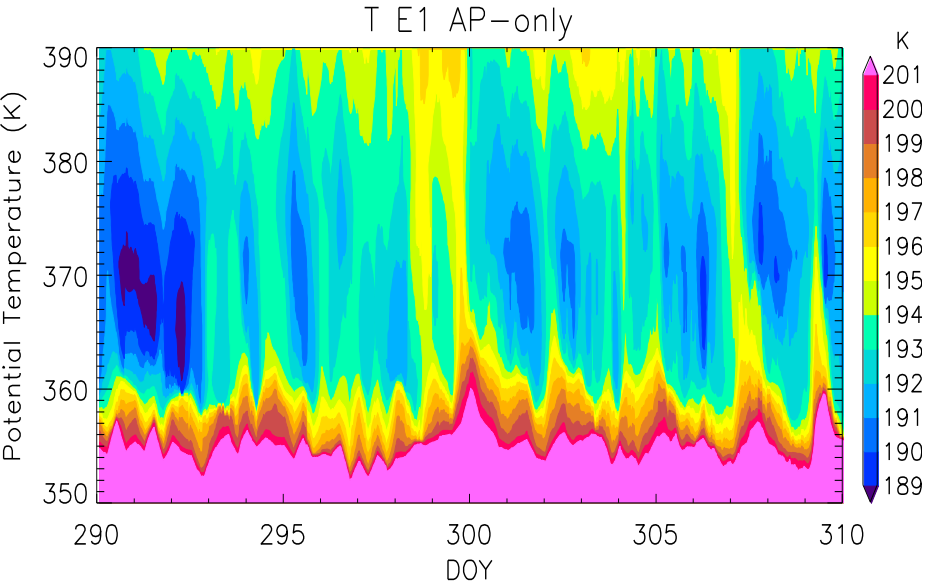


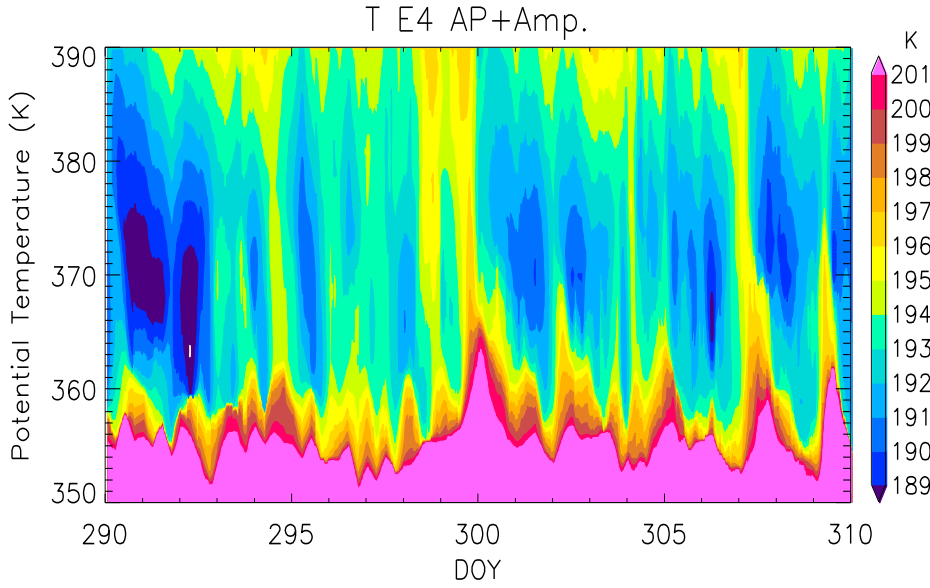
Oct 17-19:
Colder
than average
near trajectory
path
In Maritime
Continent


T Linear—interp.
T E1 AP—only
T E4 AP+Amp.
Altitude (km)
19
18
17
16
15
14
295
300
305
310
DOY
K
201
200
199
198
197
196
195
194
193
192
191
190
189


T Linear−interp.
Potential Temperature (K)
390
380
370
360
350
290
295
300
305
310
DOY
K
201
200
199
198
197
196
195
194
193
192
191
190
189


T Lenny''s waves
Potential Temperature (K)
390
380
370
360
350
290
295
300
305
310
DOY
K
201
200
199
198
197
196
195
194
193
192
191
190
189


T E1 AP−only
Potential Temperature (K)
390
380
370
360
350
290
295
300
305
310
DOY
K
201
200
199
198
197
196
195
194
193
192
191
190
189


T E4 AP+Amp.
Potential Temperature (K)
390
380
370
360
350
290
295
300
305
310
DOY
K
201
200
199
198
197
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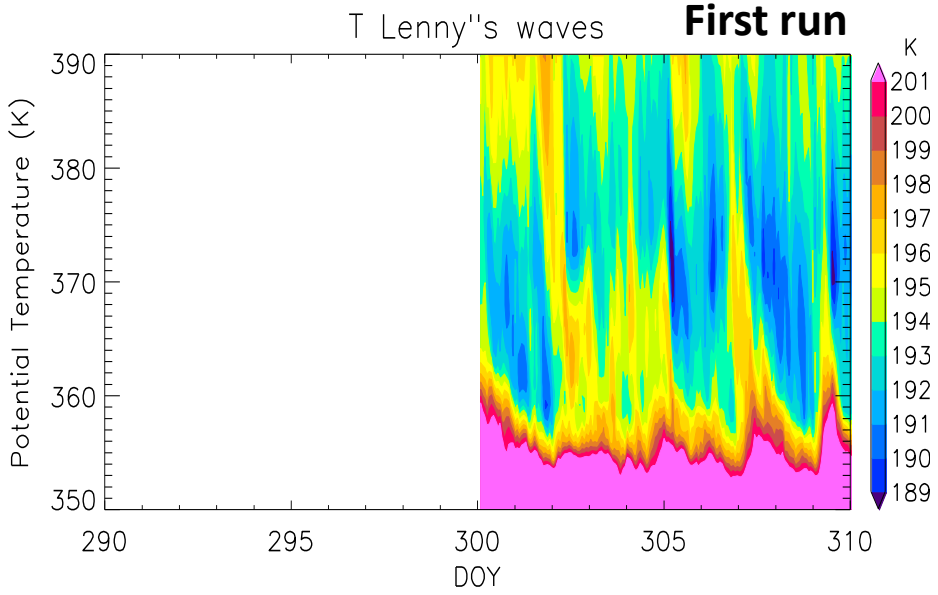
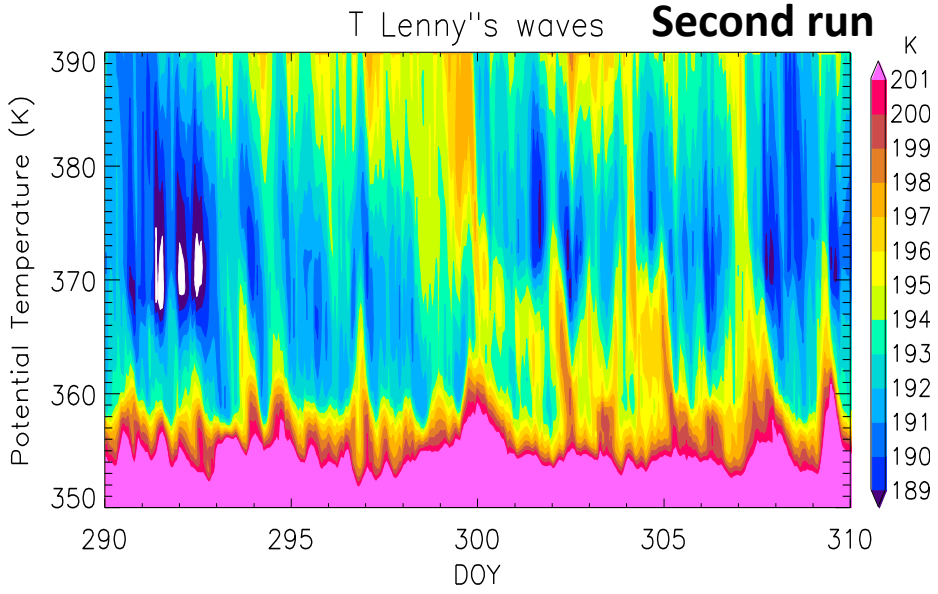
189

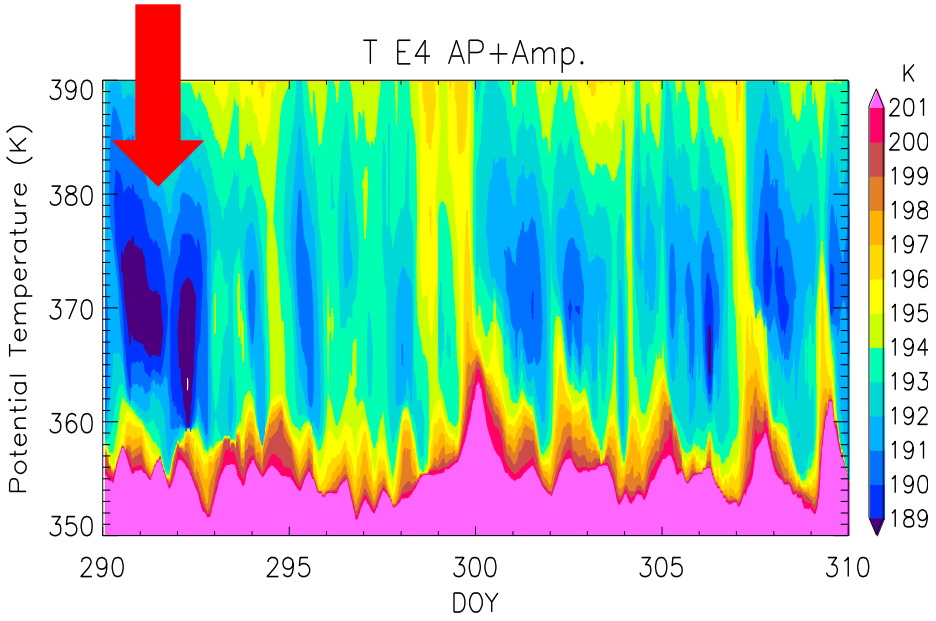




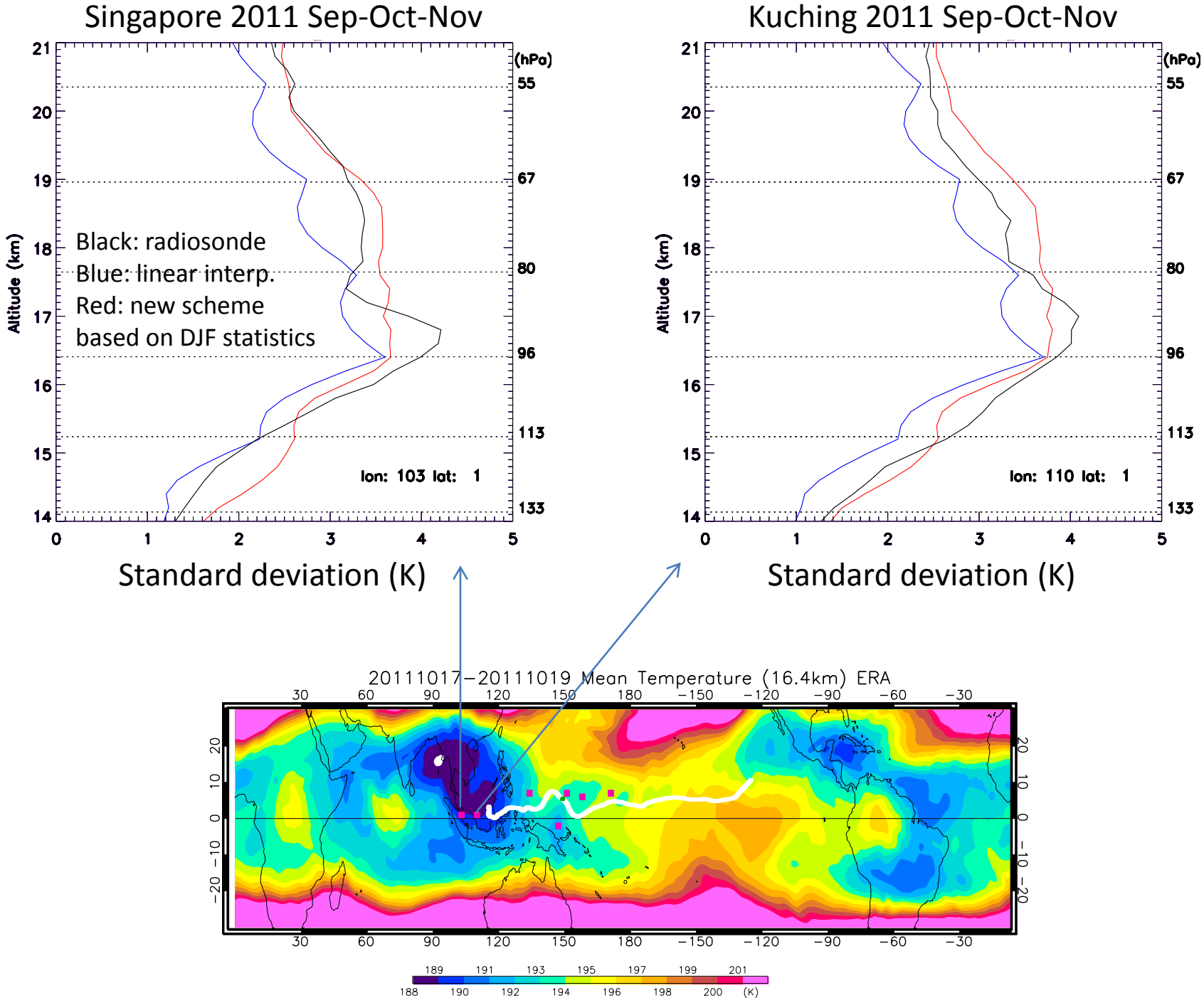
I expect a temperature curtain with Lenny's waves would be different at every run, since wave phases are random.

Question arises: Is this reliable?

Are we making Temp. too cold by exaggerating wave amplitudes?



- We'll compare radiosonde obs. and our results (E4) at sonde sites near trajectories in Maritime Continent.


Singapore 2011 Sep-Oct-Nov
Kuching 2011 Sep-Oct-Nov
Black: radiosonde
Blue: linear interp.
Red: new scheme
based on DJF statistics
Altitude (km)
(hPa)
lon: 103 lat: 1
lon: 110 lat: 1
Standard deviation (K)
Standard deviation (K)
20111017–20111019 Mean Temperature (16.4km) ERA
189 191 193 195 197 199 201
188 190 192 194 196 198 200 (K)

- Variability from our new scheme based DJF statistics is lower than radiosonde variability in the tropopause.

  → Waves should be stronger in TTL.

  → Real TTL temperatures for DOY 290-292 (Oct. 17-19) along trajectories would probably be colder than our E4 results (if the mean is correct).

- Radiosonde tropopause temperatures for Oct. 17-19 at Singapore and Kuching are colder than E4 results. (not shown here)

Plan

- Calculate wave amplification factors for different seasons and locations using radiosondes and GPS

- Build IDL routines to create new versions of MERRA and ERA-interim with high-vertical resolution