Practical Session

WMO VCP Workshop

8th December 2020, Hong Kong, China

香港天文台
HONG KONG OBSERVATORY

Welcome back after lunch

- Let's get started!
- You're assumed to possess (at least) a basic command of Linux
- Shout if you're unsure – we're here to help!
- Team HKO:
  - Ping CHEUNG ("Ping")
  - KK HON ("KK")
  - Pluto CHUI ("Pluto")

Practical Session (1)

- First, please login following the user guide
  - ssh -i id_rsa_r2_<user> r2_<user>@202.88.99.86
  - E.g. ssh -i id_rsa_r2_sam r2_sam@202.88.99.86
- Next, move to your own home directory (should be /r2/home/r2_<user>)
  - cd $HOME
- There you can find a directory called “session1” and a subdirectory “wrf”
- Go inside and take a look…
  - cd $HOME/session1/wrf
  - ls

Practical Session (2)

- There you should see, among other things,
  - wrf.exe
  - namelist.input

- But wait!
  - (For those of you who have used WRF before)
- Where are the Initial and Boundary conditions?

Practical Session (3)

- **Fear not!**
- **Staying where you are, check this directory:**
  - **ls /r2/wrf/work/wrf/**
- **You'll see there are 20 numbered folders**
  - **Namely, "1" to "20"**
- **Try & see what's inside some of them**
  - **ls /r2/wrf/work/wrf/[pick a number]**

Practical Session (4)

- **Lo and behold!**
- **There you go –**
  - **wrfbdy_d01**
  - **wrfinput_d01**

```
[r2@access2 wrf]$ ls /home/r2/lustre/wrf/work/wrf/
1   7                                CCN_ACTIVATE.BIN
10  8                                CLM_ALB_ICE_DFS_DATA
11  9                                CLM_ALB_ICE_DRC_DATA
12  aerosol.formatted                CLM_ASM_ICE_DFS_DATA
13  aerosol_lat.formatted            CLM_ASM_ICE_DRC_DATA
14  aerosol_lon.formatted            CLM_DRDSDT0_DATA
15  aerosol_plev.formatted           CLM_EXT_ICE_DFS_DATA
16  bulkdens.asc_s_0_03_0_9          CLM_EXT_ICE_DRC_DATA
17  bulkradii.asc_s_0_03_0_9         CLM_KAPPA_DATA
18  CAM_ABS_DATA                     CLM_TAU_DATA
19  CAM_AEROPT_DATA                  co2_trans
2   CAMtr_volume_mixing_ratio.A1B    coeff_p.asc
20  CAMtr_volume_mixing_ratio.A2     coeff_q.asc
3   CAMtr_volume_mixing_ratio.RCP4.5 constants.asc
4   CAMtr_volume_mixing_ratio.RCP6   create_p3_lookupTable_1.f90
5   CAMtr_volume_mixing_ratio.RCP8.5 ETAMPNEW_DATA
6   capacity.asc                     ETAMPNEW_DATA_DBL
[r2@access2 wrf]$
```

- **Now, please, each of you pick a number…**
- **(Or maybe we just do it by order of family names)**

Practical Session (5)

- **Now assume you're No. 21 (which is imaginary)**
- **Let's link (ln) the WRF initial and boundary files to your WRF working directory**
  - **ln -sf /r2/wrf/work/wrf/21/wrfinput_d01 $HOME/session1/wrf/wrfinput_d01**
  - **ln -sf /r2/wrf/work/wrf/21/wrfbdy_d01 $HOME/session1/wrf/wrfbdy_d01**
- **Then check these are properly linked**
  - **ls -l wrf***

Practical Session (6)

- Now, we're ready to begin the forecast!
- You can place job to the cluster with:
  - sbatch sbatch.sh
- You can check the state of your job with:
  - squeue

```
[r2@access2 wrf_bak]$ sbatch sbatch.sh
Submitted batch job 65745
[r2@access2 wrf_bak]$ squeue
             JOBID PARTITION     NAME     USER ST       TIME  NODES NODELIST(REASON)
             65745 vhpc-hko-   test01       r2  R       0:05      1 r630-237
[r2@access2 wrf_bak]$
```

- If it's up & running, feel free to get a cup of tea…

Practical Session (7)

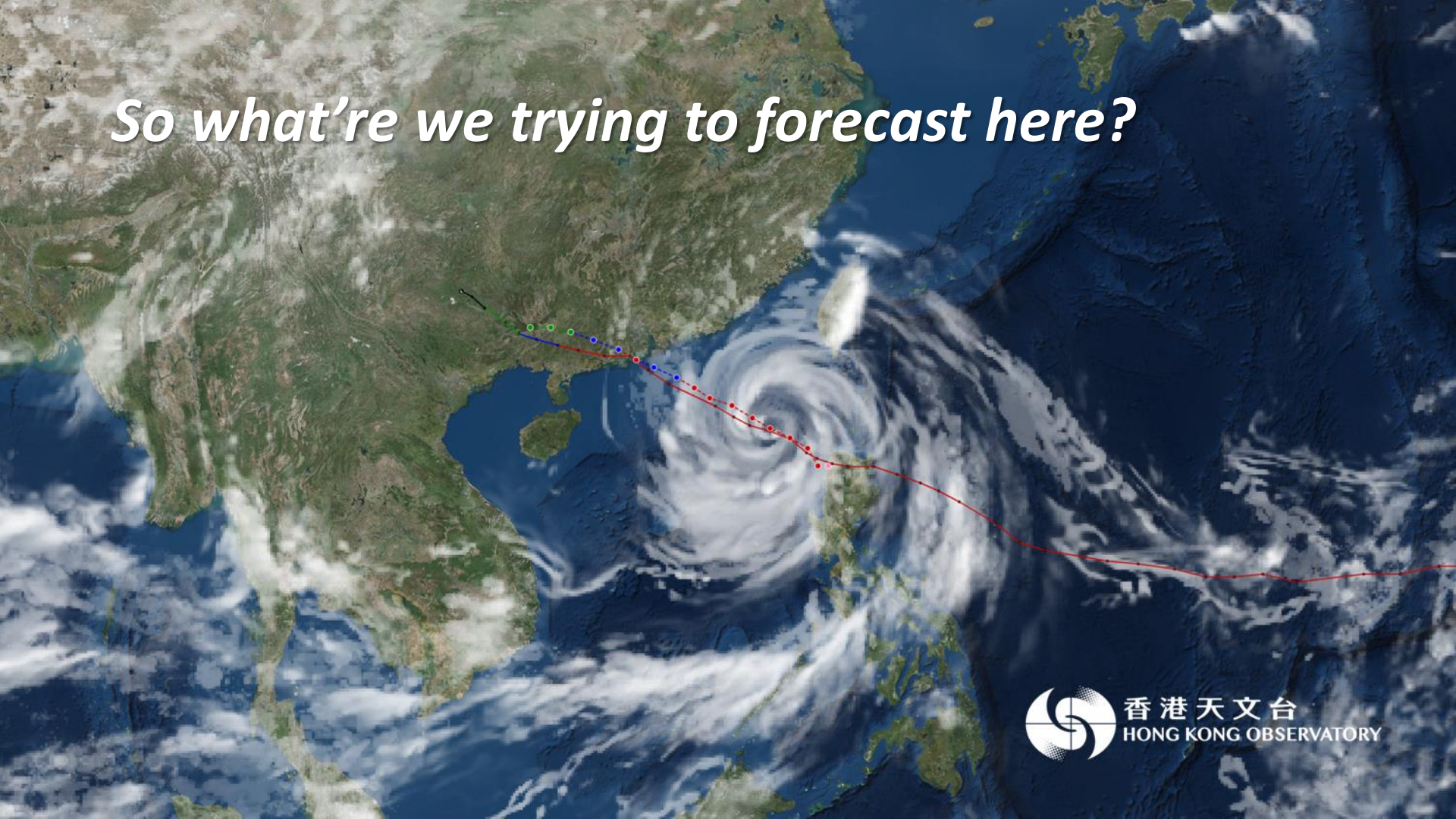
Cleaning, configuring and compiling of WRF

1. Use interactive mode to go to a worker node (of 1 core):
   - srun --ntasks=1 -p vhpc-hko-r2 --pty bash -i
2. Change directory to your own one and make a fresh start
   - cd $HOME/session7/model/WRFV3
   - ./clean –a
3. Configure your wrf compilation by (for across nodes parallel run with GNU compilers, choose option 34)
   - ./configure
4. Compile a real case of WRF by
   - ./compile em_real |& tee log.compile
5. Check the log file to see if there is no error

Practical Session (8)

Cleaning, configuring and compiling of WPS

1. Change directory to your own one and make a fresh start
   - cd $HOME/session7/model/WPS
   - ./clean –a
2. Configure your WPS compilation by (for across nodes parallel run with GNU compilers, choose option 3)
   - ./configure
3. Compile WPS by
   - ./compile |& tee log.compile
4. Check the log file to see if there is no error


So what’re we trying to forecast here?
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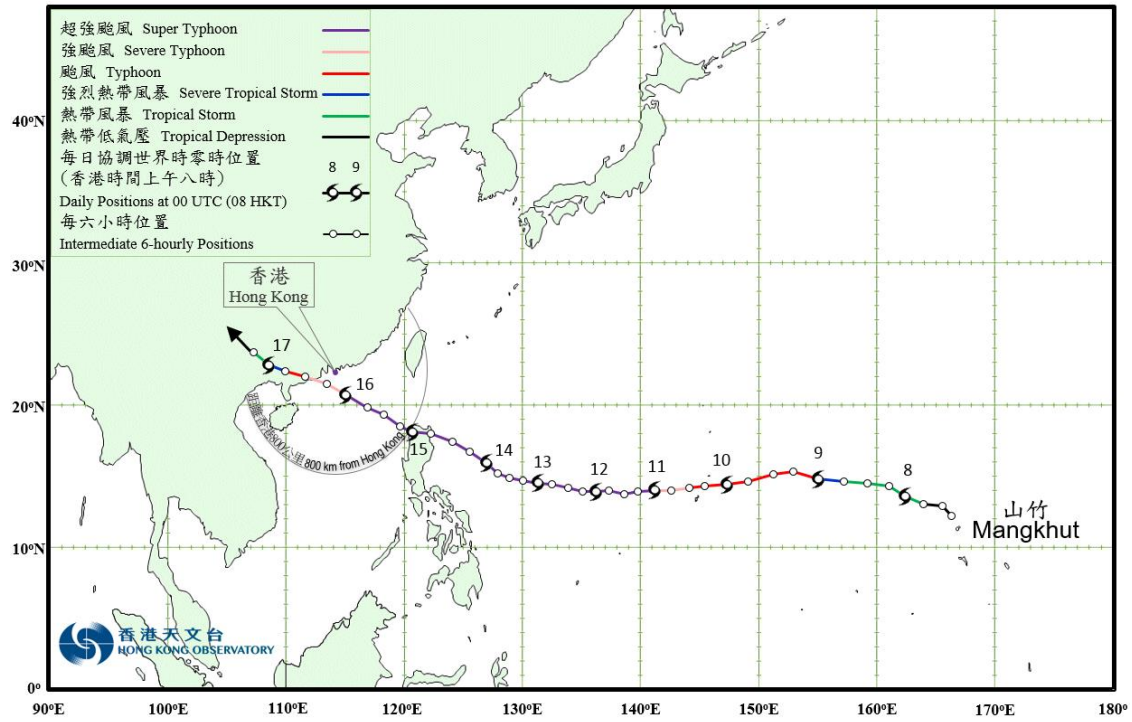
TC Mangkhut (2018)



TC Mangkhut (2018)

133

天文台總部 Observatory Headquarters
(鳴謝岑智明提供相片 Courtesy of C M Shun)

荃灣 Tsuen Wan
(鳴謝 K T Lau 提供相片 Courtesy of K T Lau)

西貢 Sai Kung
(鳴謝蔡振榮提供相片 Courtesy of CW Choy)

荔枝角道 Lai Chi Kok Road
(鳴謝 Ryan Leung 提供相片 Courtesy of Ryan Leung)

圖 3.5.15 (續)
Figure 3.5.15 (Cont'd)

134

紅磡 Hung Hom
(鳴謝吳耀華提供相片 Courtesy of Y W Ng)

旺角 Mong Kok
(鳴謝鄧先生提供相片 Courtesy of 鄧先生)

圖 3.5.16 山竹襲港期間玻璃幕牆被吹毀。
Figure 3.5.16 Shattered Glass Curtain Walls during the passage of Mangkhut.

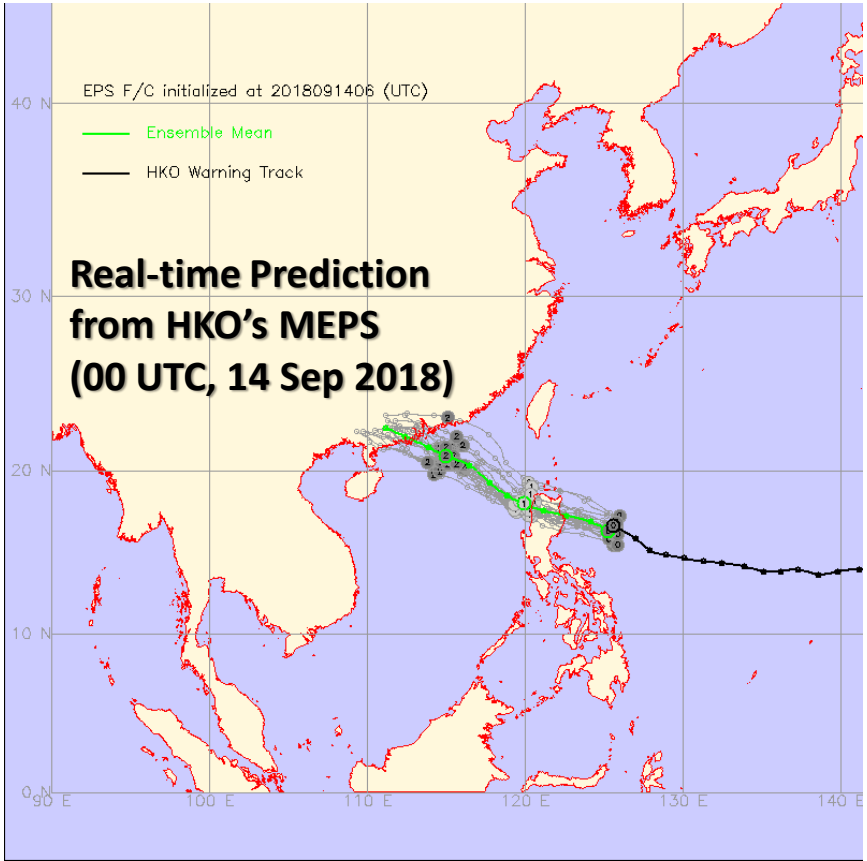
136

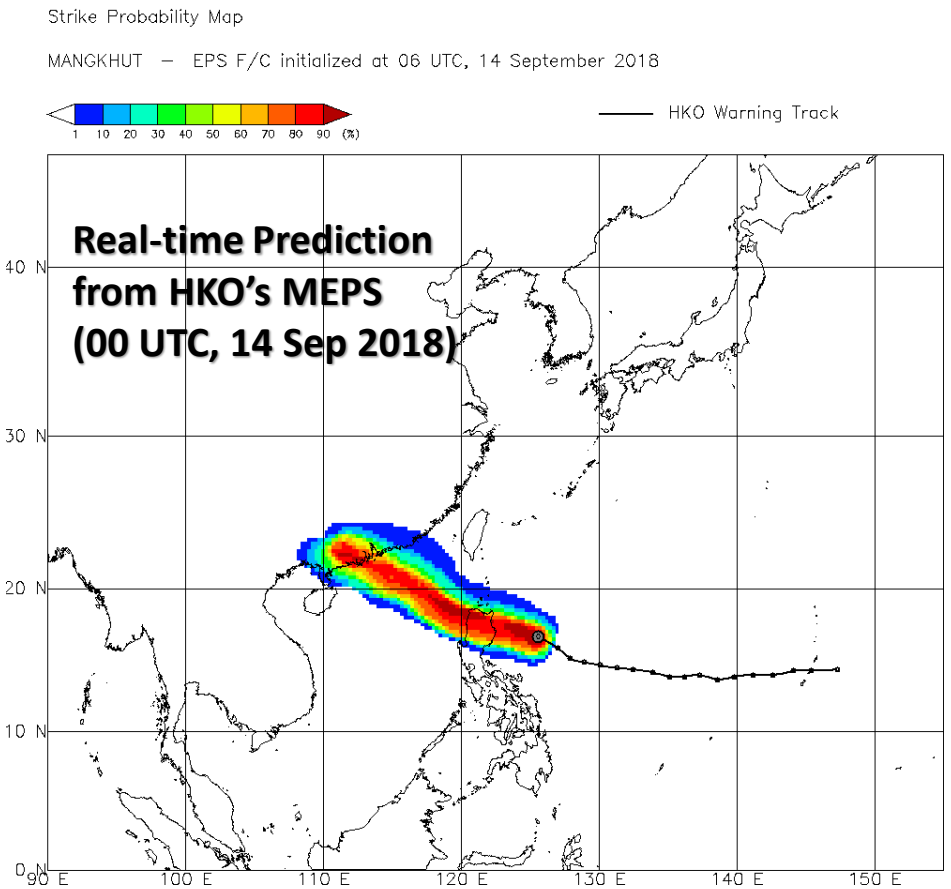
鴨脷洲海怡半島 South Horizons, Ap Lei Chau
(鳴謝 H C Chan 提供相片 Courtesy of H C Chan)

杏花邨 Heng Fa Chuen
(鳴謝 Fong Wai 提供相片 Courtesy of Fong Wai)

圖 3.5.17 山竹襲港期間巨浪拍岸。
Figure 3.5.17 High waves affected coastal areas during the passage of Mangkhut.

TC Mangkhut (2018)






Now each of you will be an ensemble member
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Practical Session (9)

- By now you're forecast should be well underway
- Let's check how far it has gone
  - ls wrfout*
- In the default namelist setting, 3-hour per output
- Using 8 processor cores, a 72-hour forecast for a single member should take around 3 hours
  - Which is why the first thing to do was start running

Practical Session (10)

- Let’s get ready for processing the WRF output
- First please go back to your WRF running directory
- Then check again the earlier WRF folder:
  - ls /r2/wrf/work/wrf/*.sh
- There is a file called “tracktc.sh”
- It calls a companion file “tracktc.ncl”

Practical Session (11)

- Get them *both*
  - cp /r2/wrf/work/wrf/tctrack.* ./
- These are short scripts, you can “cat” them to see
  - cat tracktc.sh
  - cat tracktc.ncl
- Essentially “tracktc.sh” calls on “tracktc.ncl” to help process each “wrfout_d01_*” file

Practical Session (12)

- To be able to run “tracktc.sh”, you first need to set up the environment
  - . /r2/anaconda3/0_conda_init.sh
  - conda activate ncl_env
- Then “ncl” will be available (v6.6.2)
- Now we can try run the script:
  - ./tctrack.sh