

# 地面站数据下载教程

下载全球地面站数据，共 16 个大区，每个区选取约 5 个站点，下载 2000-2020 年的数据。

## 安装 python

电脑上已经安装好 python 的跳过这一步。

浏览器打开：<https://www.python.org/>

The screenshot shows the Python.org website. The 'Downloads' menu is open, and the 'Windows' option is selected. Below, the 'Active Python Releases' table is shown, with the 'Python 3.8.10' row highlighted and the 'Download' link clicked.

Python version	Maintenance status	First released	End of support	Release schedule
3.10	bugfix	2021-10-04	2026-10	PEP 619
3.9	security	2020-10-05	2025-10	PEP 596
3.8	security	2019-10-14	2024-10	PEP 569
3.7	security	2018-06-27	2023-06-27	PEP 537
2.7	end-of-life	2010-07-03	2020-01-01	PEP 373

Release version	Release date	Download	Click for more
Python 3.8.11	June 28, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>
Python 3.7.11	June 28, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>
Python 3.6.14	June 28, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>
Python 3.9.5	May 3, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>
Python 3.8.10	May 3, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>
Python 3.9.4	April 4, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>
Python 3.8.9	April 2, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>
Python 3.9.2	Feb. 19, 2021	<a href="#">Download</a>	<a href="#">Release Notes</a>

of movement was due to it bein' tired and shagged out following a prolonged squawk.  
Owner: Well, he's... he's, ah... probably pining for the fjords.  
[Full Changelog](#)

## Files

Version	Operating System	Description	MD5 Sum	File Size	GPG
<a href="#">Gzipped source tarball</a>	Source release		83d71c304acab6c678e86e239b42fa7e	24720640	<a href="#">SIG</a>
<a href="#">XZ compressed source tarball</a>	Source release		d9eee4b2015553830a2025e4dcaa7b3	18433456	<a href="#">SIG</a>
<a href="#">macOS 64-bit Intel installer</a>	macOS	for macOS 10.9 and later	690ddb1be403a7efb202e93f3a994a49	29896827	<a href="#">SIG</a>
<a href="#">macOS 64-bit universal2 installer</a>	macOS	experimental, for macOS 11 Big Sur and later; recommended on Apple Silicon	ae8a1ae082074b260381c058d0336d05	37300939	<a href="#">SIG</a>
<a href="#">Windows embeddable package (32-bit)</a>	Windows		659adf421e90fba0f56a9631f79e70fb	7348969	<a href="#">SIG</a>
<a href="#">Windows embeddable package (64-bit)</a>	Windows		3acb1d7d9bde5a79f840167b166bb633	8211403	<a href="#">SIG</a>
<a href="#">Windows help file</a>	Windows		a06af1ff933a13f6901a75e59247cf95	8597086	<a href="#">SIG</a>
<a href="#">Windows installer (32-bit)</a>	Windows		b355cfc84b681ace8908ae50908e8761	27204536	<a href="#">SIG</a>
<a href="#">Windows installer (64-bit)</a>	Windows	Recommended	62cfla12a5276b0259e8761d4cf4fe42	28296784	<a href="#">SIG</a>

勾选将 python 加入系统环境变量

应用程序工具 下载

文件 主页 共享 查看 管理

此电脑 > Windows (C:) > Users > admin > 下载

名称 修改日期 类型 大小

python-3.8.10-amd64.exe 2022/9/8 13:45 应用程序 27,634 KB

Python 3.8.10 (64-bit) Setup

Install Python 3.8.10 (64-bit)

Select Install Now to install Python with default settings, or choose Customize to enable or disable features.

Install Now  
C:\Users\admin\AppData\Local\Programs\Python\Python38

Includes IDLE, pip and documentation  
Creates shortcuts and file associations

→ Customize installation  
Choose location and features

☒ Install launcher for all users (recommended)  
☒ Add Python 3.8 to PATH

Python 3.8.10 (64-bit) Setup

Optional Features

☒ Documentation  
Installs the Python documentation file.

☒ pip  
Installs pip, which can download and install other Python packages.

☒ tcl/tk and IDLE  
Installs tkinter and the IDLE development environment.

☒ Python test suite  
Installs the standard library test suite.

☒ py launcher ☒ for all users (requires elevation)  
Upgrades the global 'py' launcher from the previous version.

Next

Python 3.8.10 (64-bit) Setup

Advanced Options

☐ Install for all users

☒ Associate files with Python (requires the py launcher)

☒ Create shortcuts for installed applications

☒ Add Python to environment variables

☐ Precompile standard library

☐ Download debugging symbols

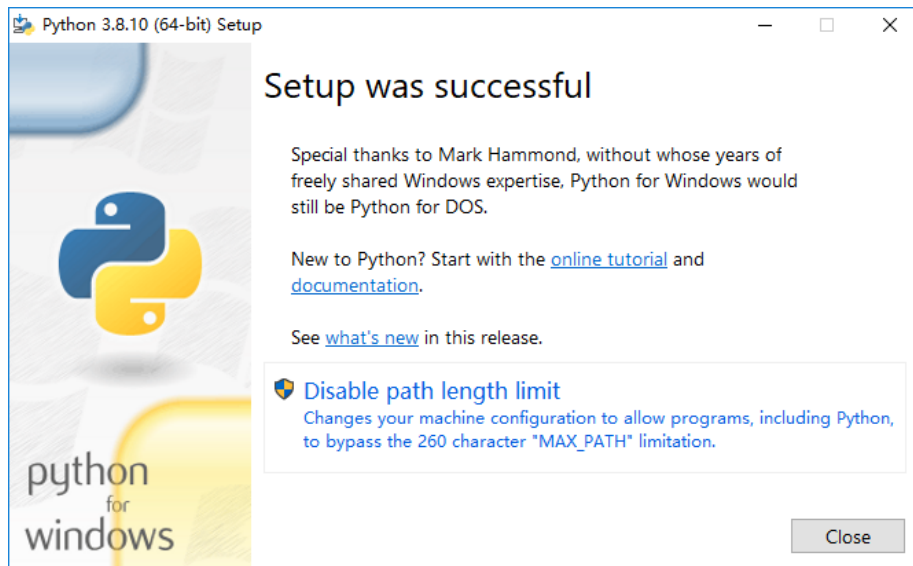
☐ Download debug binaries (requires VS 2015 or later)

Customize install location  
D:\python38

Browse

选择想安装的路径

Install



检查是否安装成功：

打开 cmd，输入“python”，出现对应的版本号即安装成功

```
命令提示符 - python
Microsoft Windows [版本 10.0.17134.860]
(c) 2018 Microsoft Corporation。保留所有权利。

C:\Users\admin>python
Python 3.8.10 (tags/v3.8.10:3d8993a, May 3 2021, 11:48:03) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
```

安装成功

## 安装下载所需的包

在 cmd 命令行中依次输入：

pip install pandas

pip install beautifulsoup4

pip install lxml

pip install fake-useragent

pip install requests

```
命令提示符

C:\Users\admin>python
Python 3.8.10 (tags/v3.8.10:3d8993a, May 3 2021, 11:48:03) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> exit()

C:\Users\admin>pip install pandas
Collecting pandas
  Downloading pandas-1.4.4-cp38-cp38-win_amd64.whl (10.6 MB)
  | 10.6 MB 384 kB/s
Collecting numpy>=1.18.5
  Downloading numpy-1.23.2-cp38-cp38-win_amd64.whl (14.7 MB)
  | 14.7 MB 6.4 MB/s
Collecting pytz>=2020.1
  Downloading pytz-2022.2.1-py2.py3-none-any.whl (500 kB)
  | 500 kB ...
Collecting python-dateutil>=2.8.1
  Downloading python-dateutil-2.8.2-py2.py3-none-any.whl (247 kB)
  | 247 kB ...
Collecting six>=1.5
  Downloading six-1.16.0-py2.py3-none-any.whl (11 kB)
Installing collected packages: six, pytz, python-dateutil, numpy, pandas
Successfully installed numpy-1.23.2 pandas-1.4.4 python-dateutil-2.8.2 pytz-2022.2.1 six-1.16.0
WARNING: You are using pip version 21.1.1; however, version 22.2.2 is available.
You should consider upgrading via the 'd:\python38\python.exe -m pip install --upgrade pip' command.

C:\Users\admin>pip install beautifulsoup4
Collecting beautifulsoup4
  Downloading beautifulsoup4-4.11.1-py3-none-any.whl (123 kB)
  | 123 kB 595 kB/s
Collecting soupsieve>1.2
  Downloading soupsieve-2.3.2.post1-py3-none-any.whl (37 kB)
Installing collected packages: soupsieve, beautifulsoup4
Successfully installed beautifulsoup4-4.11.1 soupsieve-2.3.2.post1
WARNING: You are using pip version 21.1.1; however, version 22.2.2 is available.
You should consider upgrading via the 'd:\python38\python.exe -m pip install --upgrade pip' command.

C:\Users\admin>pip install lxml
Collecting lxml
  Downloading lxml-4.9.1-cp38-cp38-win_amd64.whl (3.6 MB)
  | 3.6 MB 504 kB/s
Installing collected packages: lxml
Successfully installed lxml-4.9.1
WARNING: You are using pip version 21.1.1; however, version 22.2.2 is available.
You should consider upgrading via the 'd:\python38\python.exe -m pip install --upgrade pip' command.

C:\Users\admin>pip install fake-useragent
Collecting fake-useragent
  Downloading fake-useragent-0.1.11.tar.gz (13 kB)
Using legacy 'setup.py install' for fake-useragent, since package 'wheel' is not installed.
Installing collected packages: fake-useragent
  Running setup.py install for fake-useragent ... done
Successfully installed fake-useragent-0.1.11
WARNING: You are using pip version 21.1.1; however, version 22.2.2 is available.
You should consider upgrading via the 'd:\python38\python.exe -m pip install --upgrade pip' command.

C:\Users\admin>
```

## 修改下载的大区和站点列表

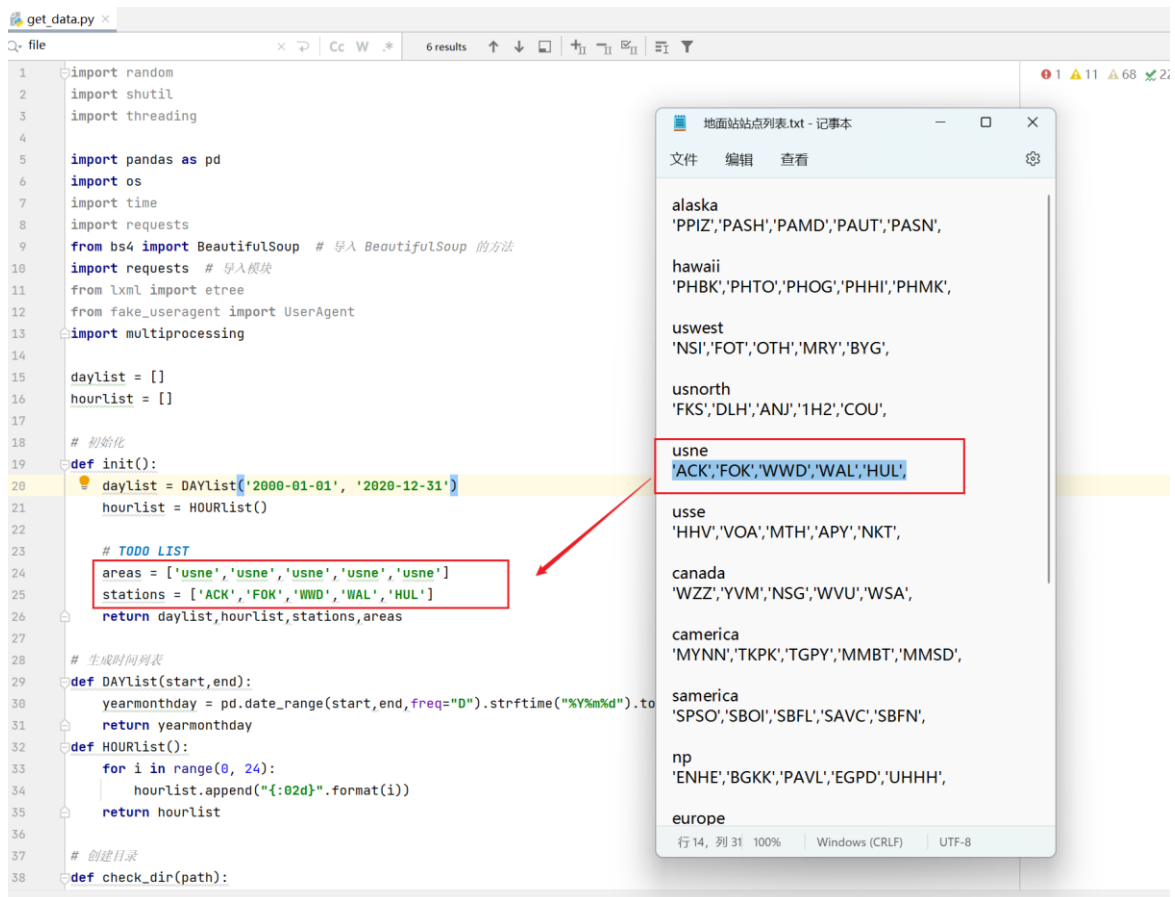
打开 get\_data.py 找到如下图所示的两行，替换对应的区域和站点

如 usne 大区下的五个站点 'ACK', 'FOK', 'WWD', 'WAL', 'HUL'

修改代码为：

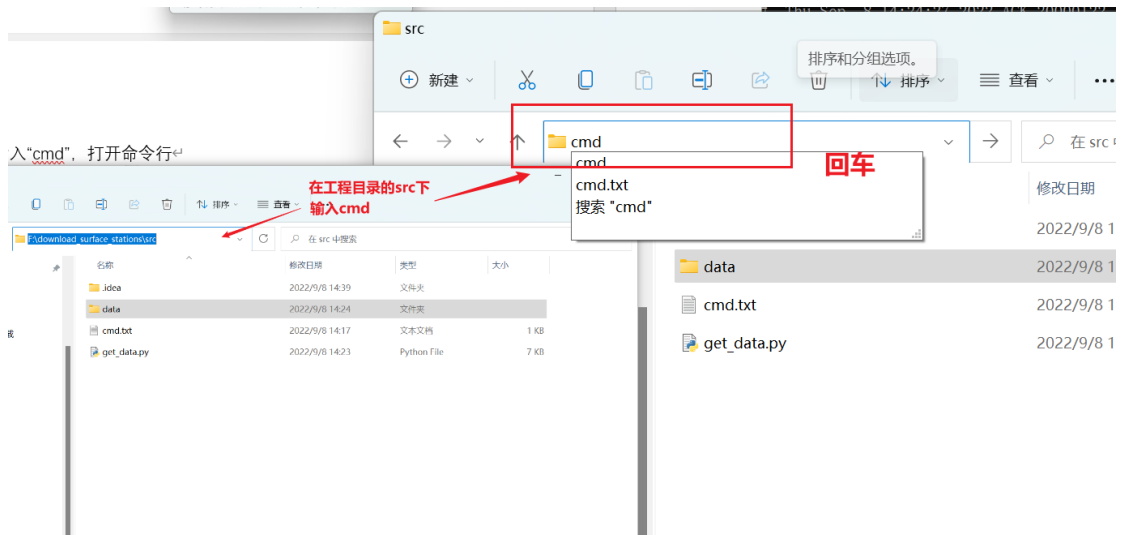
```
areas = ['usne', 'usne', 'usne', 'usne', 'usne']
stations = ['ACK', 'FOK', 'WWD', 'WAL', 'HUL']
```

修改完后保存



## 运行

修改完后在 download\_surface\_station 工程目录下的 src 输入“cmd”，打开命令行



在 cmd 命令下输入“python get\_data.py”运行代码，如下图

C:\Windows\System32\cmd.exe - python get\_data.py

Microsoft Windows [版本 10.0.22000.856]  
(c) Microsoft Corporation。保留所有权利。

F:\download\_surface\_stations\src>python get\_data.py

#####

['ACK', 'FOK', 'WWD', 'WAL', 'HUL']

#	Thu	Sep	8	14:24:27	2022	ACK	20000101	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000102	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000103	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000104	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000105	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000106	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000107	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000108	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000109	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000110	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000111	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000112	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000113	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000114	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000115	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000116	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000117	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000118	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000119	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000120	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000121	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000122	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000123	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000124	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000125	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000126	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000127	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000128	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000129	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000130	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000131	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000201	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000202	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000203	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000204	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000205	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000206	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000207	完成请求
#	Thu	Sep	8	14:24:27	2022	ACK	20000208	完成请求

```
C:\Windows\System32\cmd.exe - python get_data.py
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=09&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=10&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=11&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=12&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=13&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=14&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=15&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=16&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=17&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=18&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=19&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=20&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=21&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=22&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000215&HOUR=23&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000216&HOUR=00&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000216&HOUR=01&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000216&HOUR=02&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000216&HOUR=03&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000216&HOUR=04&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000216&HOUR=05&UNITS=M&STATION=ACK
获取到数据
请求 http://weather.uwyo.edu/cgi-bin/wyowx.fcgi?TYPE=sflist&DATE=20000216&HOUR=06&UNITS=M&STATION=ACK
```

# 结果

会在 get\_data.py 的同一目录下的 data 中下载数据，目录结构为：大区、站点、年份、日期、按小时生成的数据文件，如下图：



可以打开看数据是否正常

get_data.py	ACK_20000101_00.txt
1	University of Wyoming, Atmospheric Science
2	Observations for NANTUCKET MEMORIAL, MA (ACK)
3	Location: 41.25N 70.07W 15 meters
4	2353Z 30 Dec 1999 to 2353Z 31 Dec 1999
5	
6	STN TIME PMSL ALTM TMP DEW RH DIR SPD VIS CLOUDS Weather MIN MAX P01 PCP
7	DD/HHMM hPa hPa C C % deg m/s km C C mm mm
8	====
9	ACK 31/2353 1019.0 1019.0 1 1 96 330 3 16.1 FEW010 1 4
10	ACK 31/2253 1018.2 1018.3 2 1 92 340 4 16.1 FEW015 BKN025 BKN030
11	ACK 31/2153 1017.6 1017.6 3 1 89 340 5 16.1 BKN022
12	ACK 31/2053 1016.9 1016.9 3 2 89 340 4 16.1 SCT022 BKN033
13	ACK 31/1953 1016.2 1016.3 3 2 92 330 5 16.1 OVC039
14	ACK 31/1853 1015.7 1015.6 4 2 89 350 5 16.1 SCT009 OVC014
15	ACK 31/1753 1015.8 1015.9 3 3 97 340 5 16.1 BKN012 OVC021 2 5 0.25 0.76
16	ACK 31/1653 1016.1 1016.3 4 3 93 20 3 12.9 BKN018 OVC031 -RA 0.25
17	ACK 31/1553 1016.6 1016.6 4 3 89 50 3 12.9 BKN022 OVC034 -RA 0.25
18	ACK 31/1453 1016.7 1016.9 5 3 86 40 5 16.1 OVC025 0.00 0.00
19	ACK 31/1353 1016.8 1016.9 5 3 86 20 2 16.1 OVC027 -RA 0.00
20	ACK 31/1253 1016.4 1016.6 3 1 85 350 3 16.1 FEW041 OVC049
21	ACK 31/1153 1016.1 1016.3 2 -1 79 320 2 16.1 FEW050 BKN070 BKN090 2 4
22	ACK 31/1053 1015.5 1015.6 2 -2 75 0 0 16.1 SCT110
23	ACK 31/0953 1015.5 1015.6 2 -2 75 330 3 16.1 CLR
24	ACK 31/0853 1014.8 1014.9 3 -2 67 340 3 16.1 FEW120
25	ACK 31/0753 1014.8 1014.9 4 -2 67 340 4 16.1 CLR
26	ACK 31/0653 1014.4 1014.6 4 -1 67 320 4 16.1 CLR
27	ACK 31/0553 1013.7 1013.9 4 -1 70 330 4 16.1 CLR 3 6
28	ACK 31/0453 1013.5 1013.6 5 -1 67 310 4 16.1 CLR
29	ACK 31/0353 1013.3 1013.6 4 2 89 280 3 14.5 CLR
30	ACK 31/0253 1013.2 1013.2 4 2 89 270 3 14.5 CLR
31	ACK 31/0153 1012.7 1012.9 5 2 82 280 3 14.5 CLR
32	ACK 31/0053 1012.0 1012.2 4 2 83 260 4 16.1 CLR
33	ACK 30/2353 1011.5 1011.5 6 2 79 260 5 16.1 CLR 6 9
34	