MET services in support of ATM Operations in China

MET/ATM Webinar 2022

Presented by China

Content

01

MET Services and Products

- Tailored Meteorological services and products to support Air Traffic Management Operations

MET Services and Products

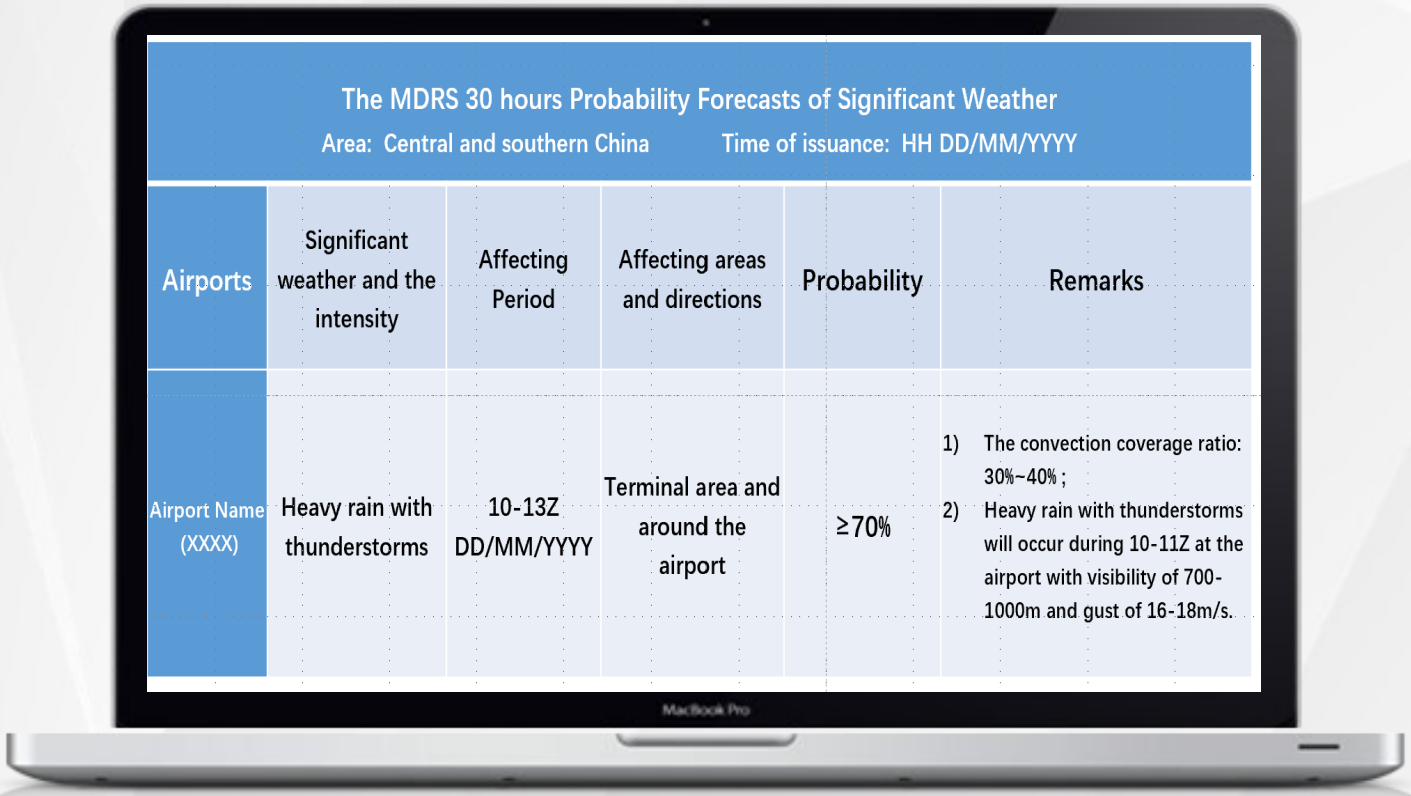
Massive Delay Response System (MDRS) MET Services

Daily Weather Briefing

Collaborative Consultation

Multiple MET Products

Massive Delay Response System (MDRS) MET Services



Pre-tactical Stage (12-30h)

30 hours probability forecasts of significant weather are provided every day for pre-tactical ATFM decision making.

Tactical Stage (2-6h)
(Regional Significant Weather Forecasts)

Regional significant weather forecasts aiming to predict the hazardous weather on the major routes are generated to support air traffic management measures.

Command Stage (<2h)
(Terminal area and Aerodrome Weather Warnings and Alerts)

Terminal area warnings are issued and updated every two hours once the MDRS is initiated.

Daily Weather Briefing

Meteorologist

- Provides daily weather briefing about the severe weather in the next 24 hours on the busy routes and the terminal areas

ATM Controller

- Analyzes the situation of expected traffic capacity decline and proposed traffic management initiatives

ATFM Controller

- Formulates CDM release policy according to the proposed flow management measures

Chief Controller

- Predict the operation situation and determine the traffic management initiatives to be taken

- On-site Collaborative Consultation

Face to face

The consultations mainly focus on the adverse weather at the airports, busy terminal sectors, air routes and key navigation points in the next 6 hours.

Higher Frequency

Conduct collaborative consultation every 2h during thunderstorm seasons to transfer information in time

Information Visualization

Develop MET and ATM information integration system to build up common situational awareness

Multiple MET Products

Aerodrome
Weather Warning

Runway Wind
Forecast Product

02

Developments in CDM

- MET and ATM coordination
- Products in support of Collaborative Decision Making

Collaborative Convective Forecast Product (CCFP)

- When Issued?
  Three times a day
  (around 02Z, 06Z and 10Z)

- Who Issued?
  Aviation Meteorological Center or Regional Meteorological Center
  Meteorologists

- What Forecasted?
  The convective weather in the next 2,4,6,8 hours

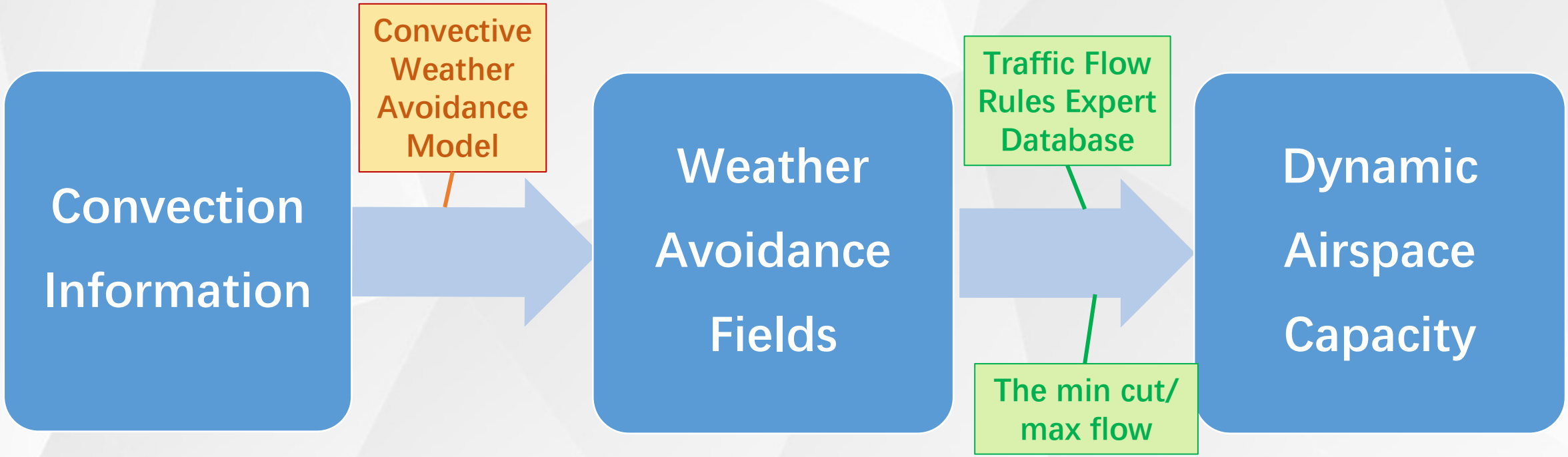
- What it for?
  in support of 2-8 hours operational
  decision making

03

ATM impacts conversion

- Quantifying weather impacts on airspace capacity

- Convection Dynamic Capacity Assessment System (CDCAS)



➢ Reference: 《对流天气对航空运行区域通行能力影响研究与验证》 项目

The information in this part mainly refer to the technical program called “Research and Verification of Convective Weather Impacts on Traffic Capacity in Aviation Operation Area ”

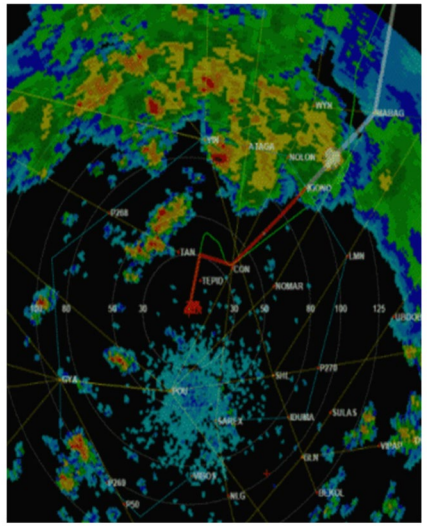
Convective Weather Avoidance Model

The process of building a Convective Weather Avoidance Model

Select typical thunderstorm cases

1.	3 月 30 日.	系统性.	飑线.
2.	4 月 26 日.	系统性.	飑线.
3.	5 月 8 日.	系统性.	大范围雷雨.
4.	5 月 11 日.	系统性.	飑线.
5.	5 月 17 日.	系统性.	飑线.
6.	5 月 18 日.	系统性.	飑线.
7.	5 月 22 日.	系统性.	飑线.
8.	5 月 23 日.	系统性.	大范围雷雨.
9.	6 月 6 日.	系统性.	飑线.
10.	6 月 20 日.	热力性.	多单体.
11.	6 月 25 日.	热力性.	多单体.
12.	7 月 8 日.	热力性.	多单体.
13.	7 月 11 日.	热力性.	多单体.
14.	8 月 13 日.	系统性.	飑线.
15.	8 月 19 日.	系统性.	大范围雷雨.

Marking features of flights rerouting



Setting factors for the model

Range scale(km): 6,8,10,12,16,20,24,30,36, 40,50,60;
Coverage Rate(%): 5,10,20,30,40,50,60,70,80, 90
Reflectivity Intensity(dBZ): 15,20,25,30,35,40,45

Gaussian Classification Method

Get the output: Weather Avoidance Fields

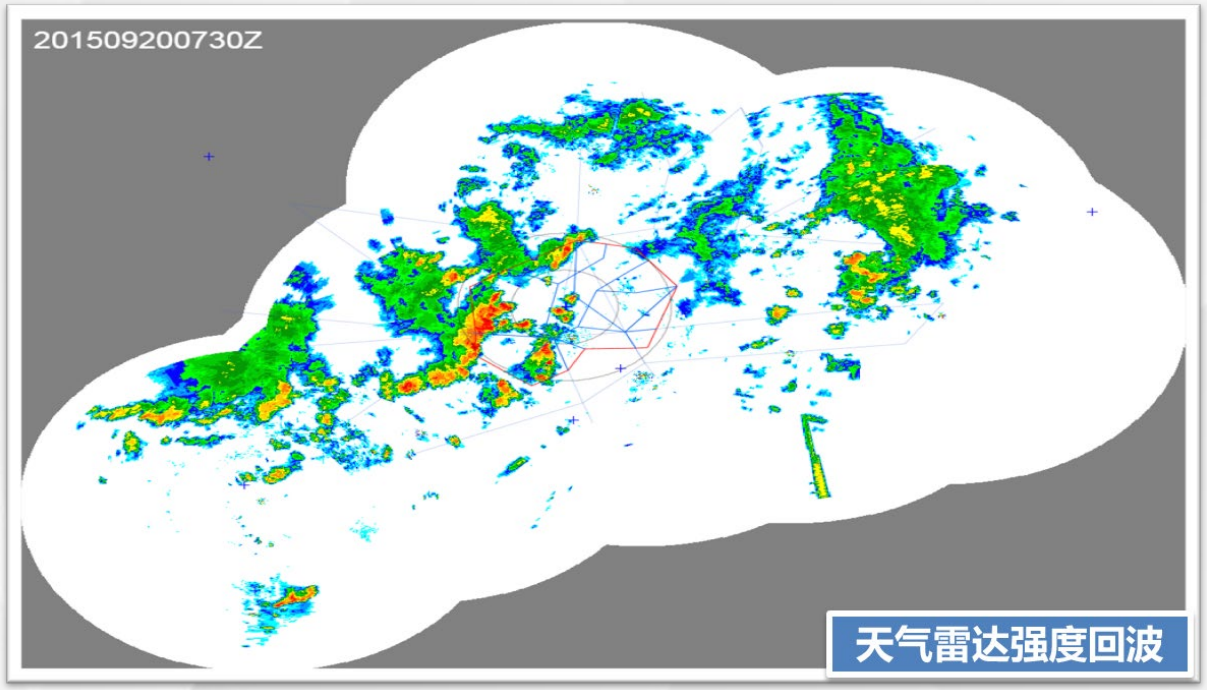
Range: 8*8km

Coverage rate: ⩾20%

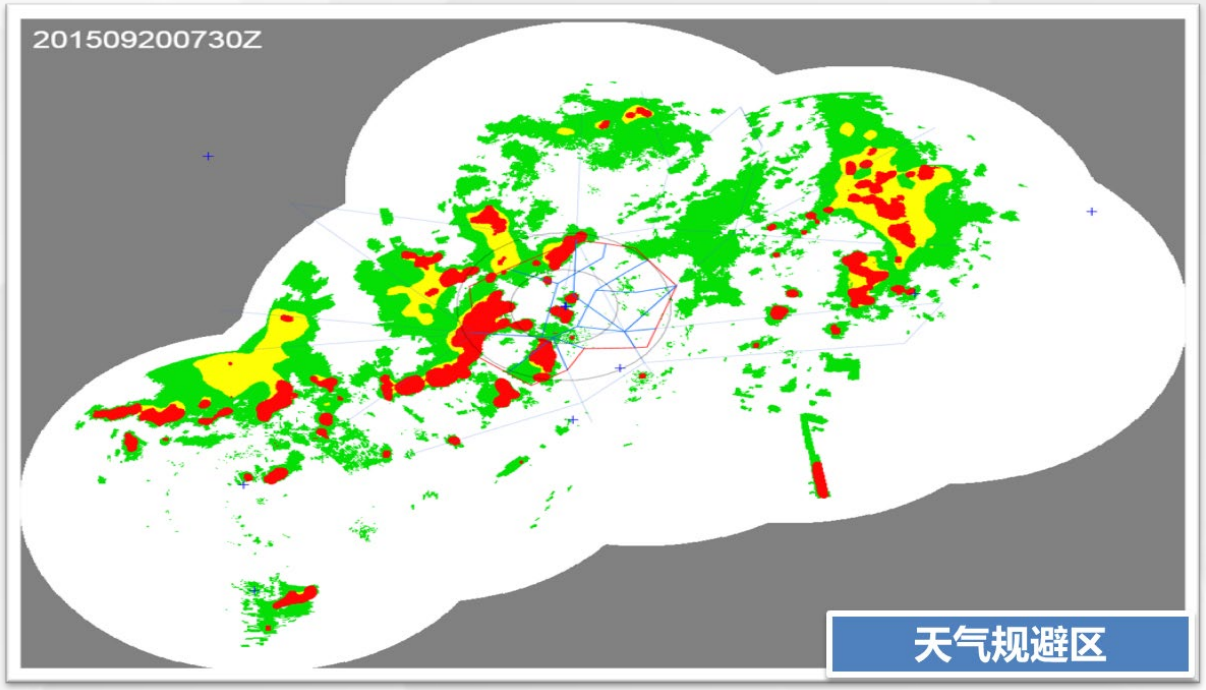
Radar products type:CAPPI(3km);

Intensity:⩾35dBZ

- Convective Weather Avoidance Fields



Weather Radar Reflectivity



Convective Weather Avoidance Fields

The WAF is defined as an area where the greater than 35dBZ convection coverage rate exceeds 20%.

- Establishment of the traffic flow rules expert database

Collect history operational data

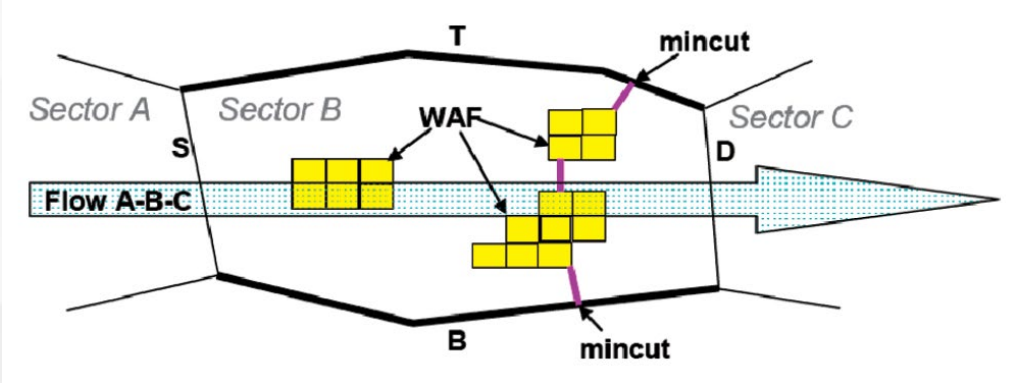
Analyze the traffic flow and the airspace capacity in selected convective weather scenarios

Analyze the flight flow

Analyze ATM controllers' work load

Analyze the airspace capacity

- Objective assessment of capacity

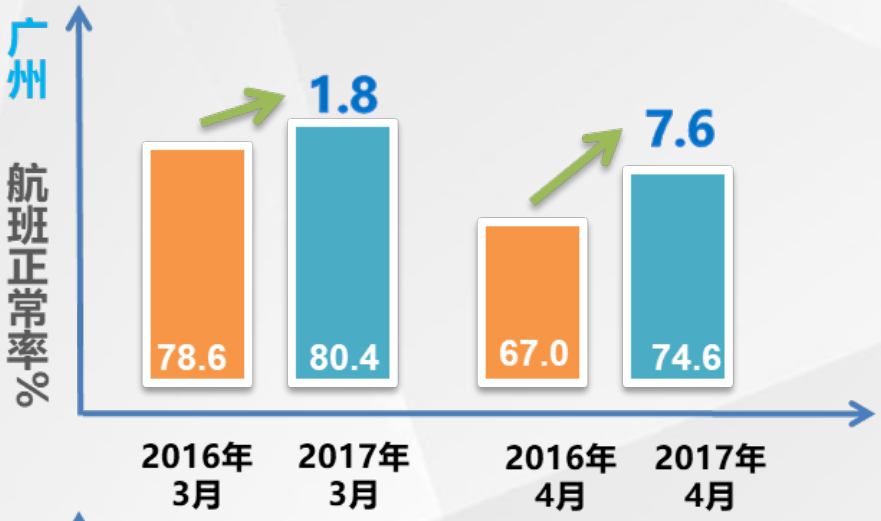


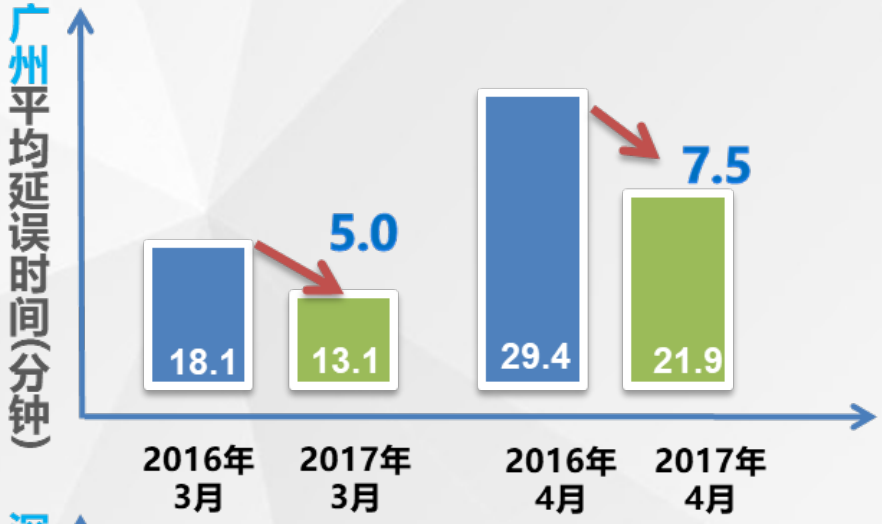
The Min. cut/Max. flow theorem was applied to obtain the dynamic, quantitative and objective assessment and 2-hour prediction of airspace capacity

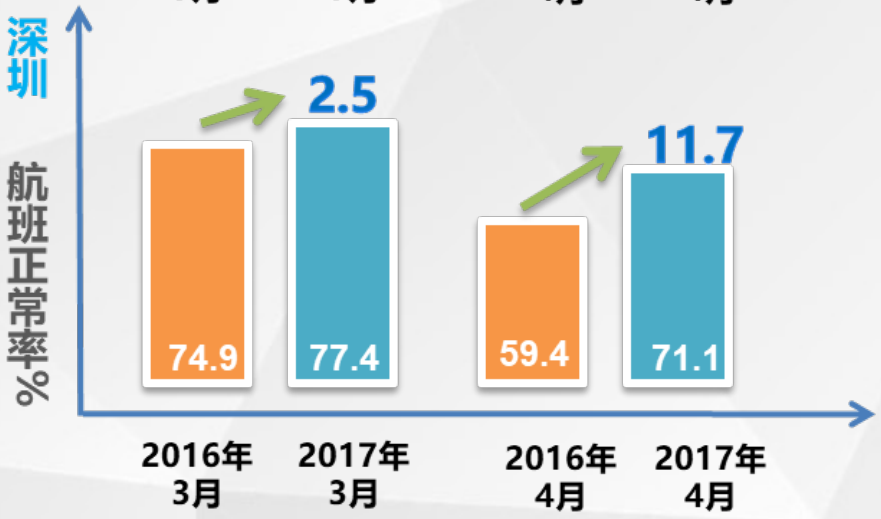
- Convection Dynamic Capacity Assessment System (CDCAS)

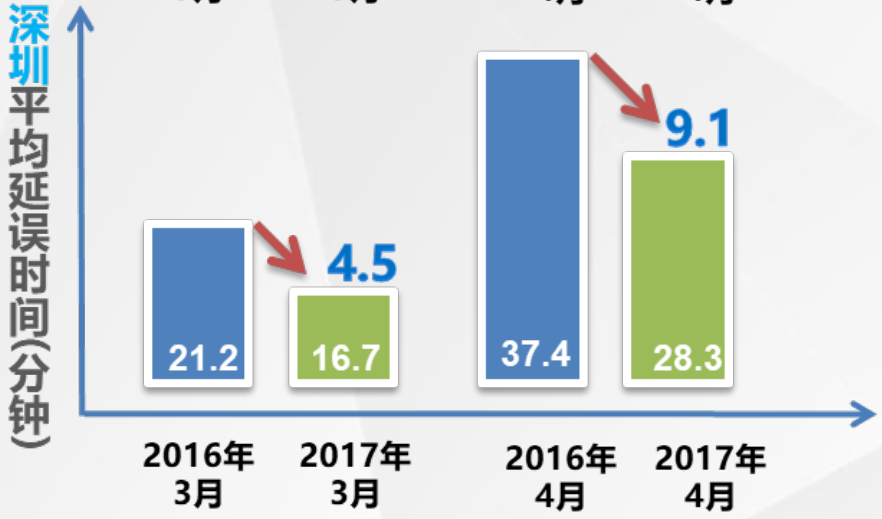
The airspace capacity of the flights entering the terminal area and planning to land at the Airport.

- Improvements in the on-schedule rate of flights









04

Conclusion

- MET Services and Products
- Developments in CDM
- ATM impacts conversion

Conclusions

- Based on numerical weather prediction models and convection nowcasting systems, multiple tailored ATM meteorological services and products are provided in China.

- Meteorological products supporting collaborative decision making like CCFP have been issued and will be improved in the future.

- A Convection Dynamic Capacity Assessment System (CDCAS) has been developed to estimate the weather impacts on airspace capacity.

- Quantitative and objective assessment of the weather impacts helps ATM and ATFM operate in a more efficient way.

Thank you very much!

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