Meteorology

in Pilot Education

Lecture at Meteorological Workshop of OSTIV
İstanbul, 17 September 2005

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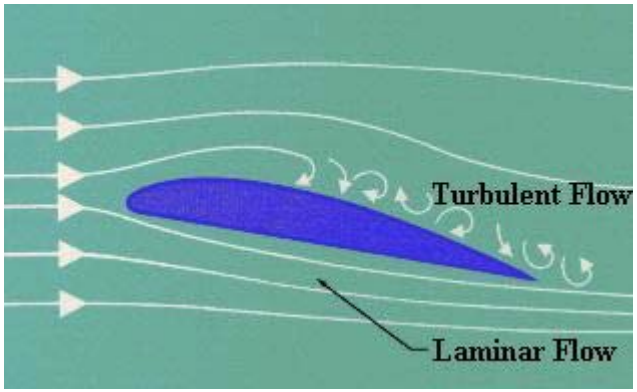
Overview

1. Importance of atmosphere für aviation
2. Obejctives of meteorology lessons
3. Content
4. How the lessons are held
5. Problems

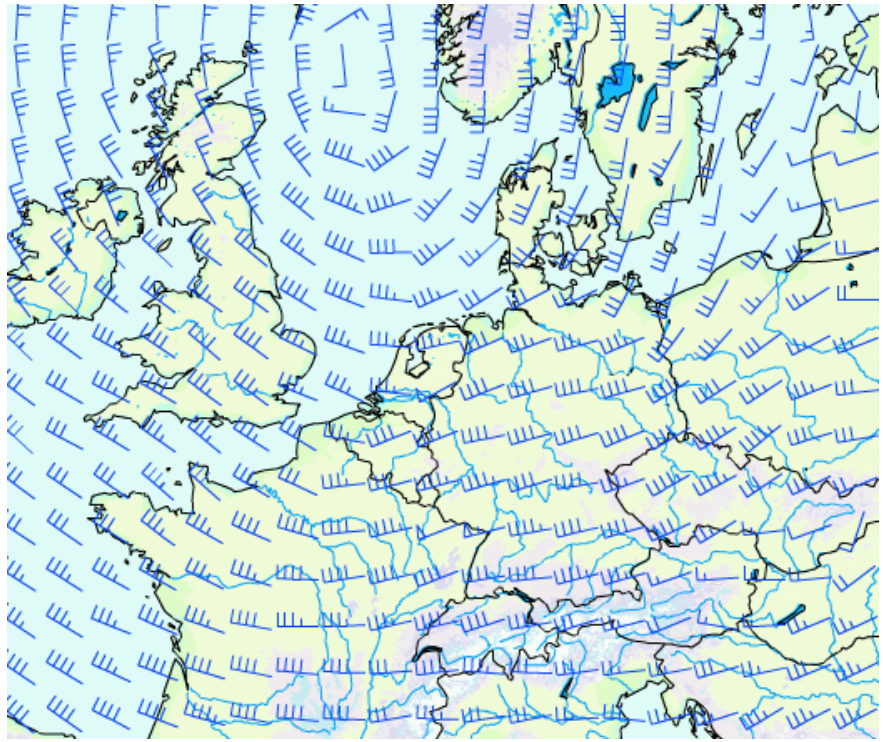
Importance of atmosphere for aviation

Provision of lift

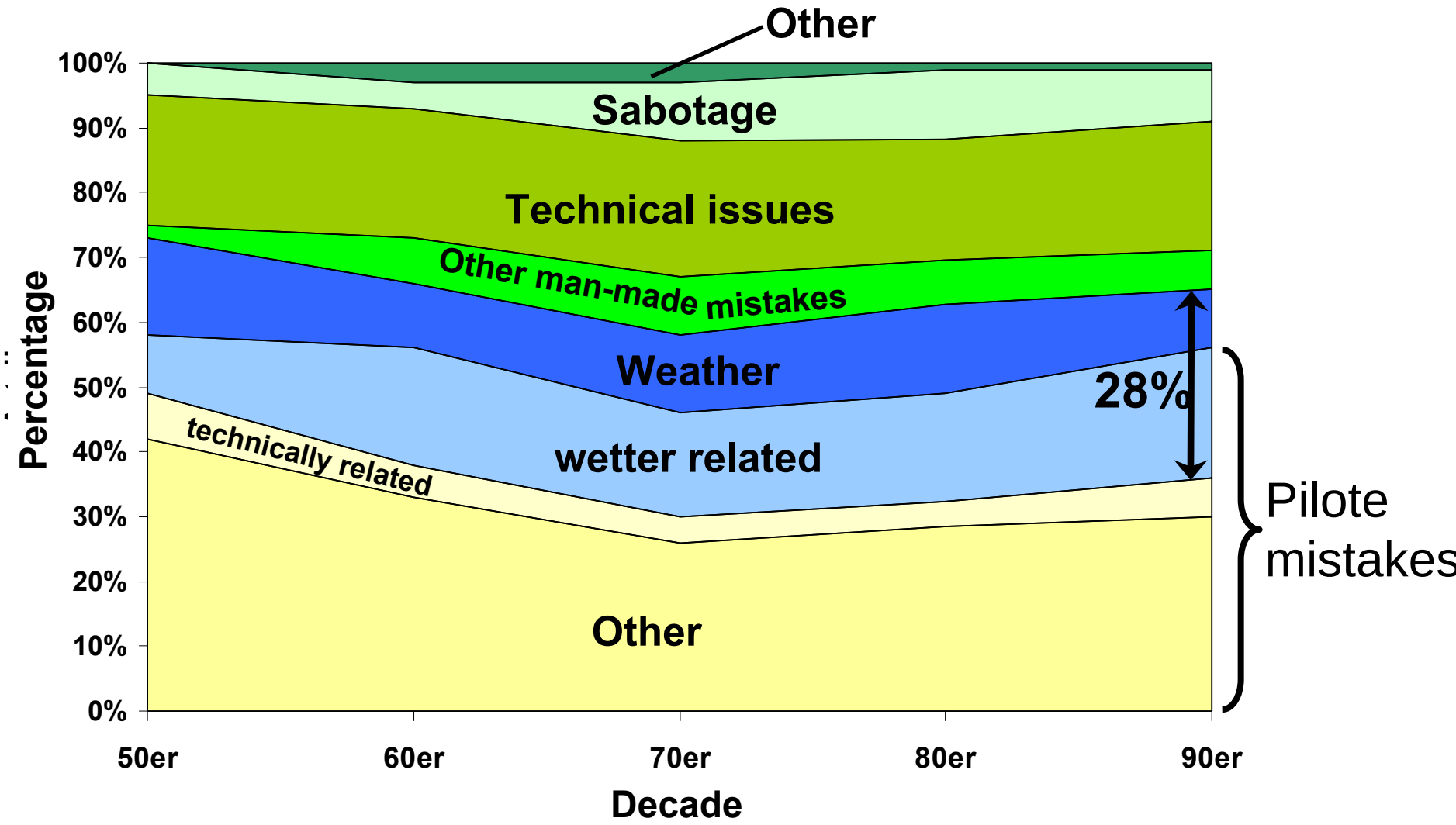


Hazards

Basis for flight planning



Flight accidents by causes



Distribution of theory education

Subject	Lesson hours (45 minute units)
Air Law	126
Aircraft General Knowledge	288
Flight Performance & Planning	74
Human Performance & Limitation	84
Meteorology	146
Navigation	330
Operational Procedure	56 [1]
Principle of Flight	50
Communications	30
Total	1184

[1] 4 hours will be held during meteorology lessons

LuftVO - Meteorological flight preparation

§ 3a Flight Preparation

(1) ...

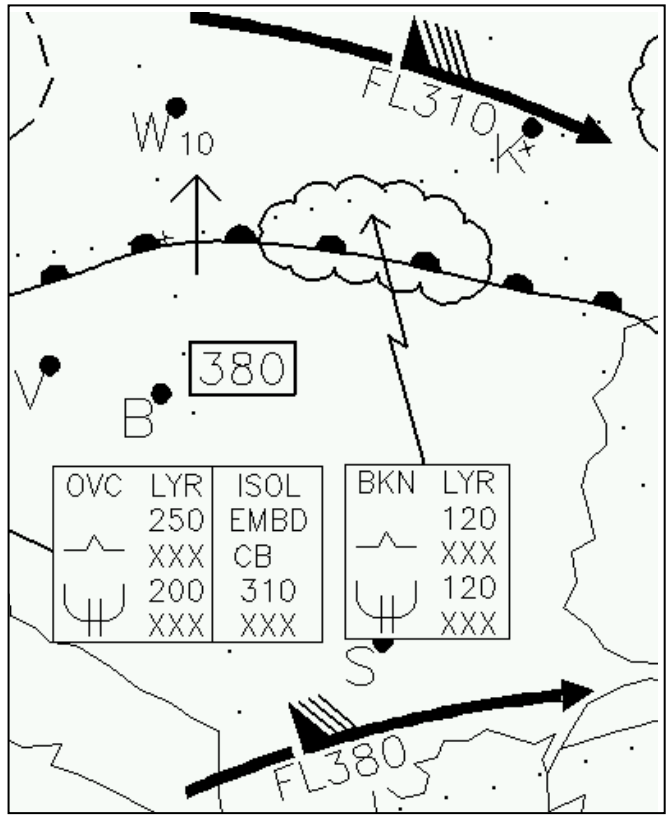
(2) For a flight going beyond the near surrounding of the aerodrome (crosscountry-flight) and before an IFR flight,the responsible pilot has to get sufficient information on the available flight weather reports and forecasts. [...]

Obejectives of Meteorology education

- Prerequisite knowledge for technics, navigation, air law, human performance and limitations
- Ability for judgements of dangers
- Ability to understand the products of aviation weather forecasts
- Passing the official test by aviation authorities

Meteorological phenomena and hazards

?



Learning objectives

JAR-FCL Learning Objectives ...

050 01 00 00	THE ATMOSPHERE
050 01 01 00	Composition, Extent, Vertical Division

050 01 01 01	Describe the vertical division of the atmosphere, based on the temperature variations with height:
	- List the different layers and their main qualitative characteristics
	  - Describe the troposphere
	  - Define tropopause

Examinations

At which altitude and at which season can an aeroplane be influenced by the equatorial Jet Stream?

- [x] at FL 500 from Juni to August
- [ ] at FL 500 from November to Februar
- [ ] at FL 400 from Winter of northern hemisphere
- [ ] at FL 400 from Winter of southern hemisphere

Which type of aircraft icing can occur at FL 100 in a thunderstorm with a freezing level at 7000 ft?

- [x] Moderate to severe clear ice
- [ ] light rime ice
- [ ] Moderate to severe rime ice
- [ ] light clear ice

How we teach?

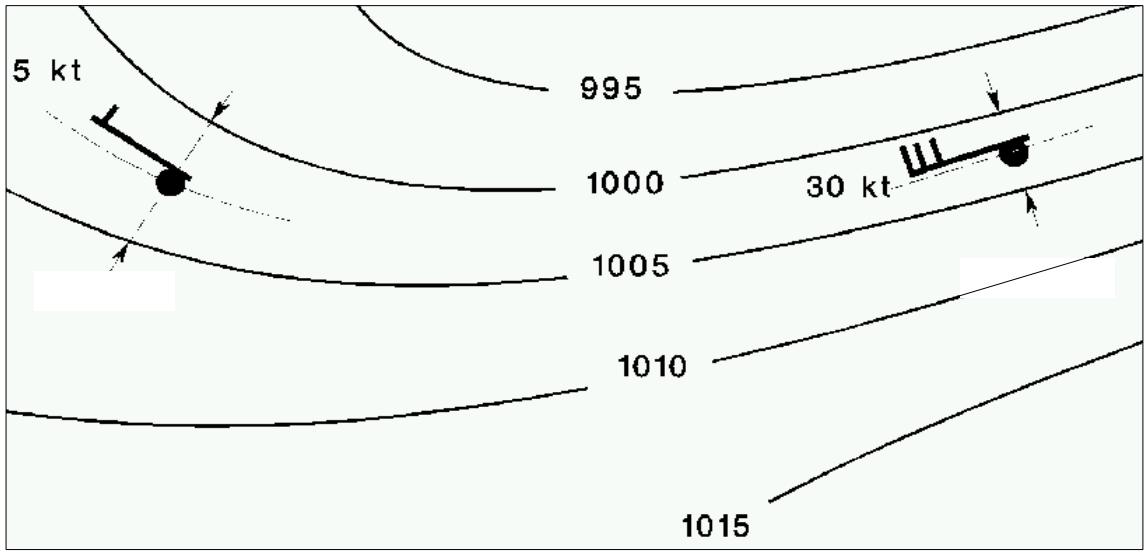
How meteorology is taught?

The world for meteorologists…

$$\frac{\partial u}{\partial t} + u\frac{\partial u}{\partial r} + \frac{v}{r}\frac{\partial u}{\partial \phi} + w\frac{\partial u}{\partial z} - \frac{v^2}{r} = -\frac{1}{\rho}\frac{\partial p}{\partial r},$$

$$\frac{\partial v}{\partial t} + u\frac{\partial v}{\partial r} + \frac{v}{r}\frac{\partial v}{\partial \phi} + w\frac{\partial v}{\partial z} + \frac{uv}{r} = -\frac{1}{\rho r}\frac{\partial p}{\partial \phi},$$

$$\frac{\partial w}{\partial t} + u\frac{\partial w}{\partial r} + \frac{v}{r}\frac{\partial w}{\partial \phi} + w\frac{\partial v}{\partial z} = -\frac{1}{\rho}\frac{\partial p}{\partial z} - g$$



… and how we teach

How meteorology is taught?

QNH = QFE + ELEV/27

Density Altitude = Pressure Altitude + 120 * ΔISA

MSA	18000 ft
-ELEV	-1500 ft
= T.HGT	16500 ft
- T.HGT*0,004 * ΔISA	-(-660) ft
= HGT	17160 ft
+ QNE	+1200 ft
PA	18360 ft

Minimum Usable Flight Level: FL 190

Problems

- Lerning Objectives - Content?
- Quality und Relevance of official exam questions
- Practical relevance of the lessons
- Internally: sequence of topics
- Feedback of pilots

Thank you for your attendance

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