

# THE BLIZZARD FROM 25-26 OCTOBER 2014 AND ITS IMPACT ON AIR FLIGHTS

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## **ABSTRACT. The blizzard from 25-26 October 2014 and its impact on air flights.**

On a calendar basis, October is considered the middle month of the fall, and for this reason, some meteorological phenomena such as blizzards, specific of the cold season, may occur extremely rare. Throughout the latest years there haven't been any blizzards on this specific month, the earliest snow occurring on 15 October 1970 and the first snow cover on 26 October 1988. Climatologically the first month in which blizzard occurs is November with 0-1 days, when the multi-annual average is 0.4 days, therefore, the occurrence of this phenomenon on this month may be considered as an abnormal event which exceeds by far the multi-annual climatologic normalized standards. In order to highlight the synoptic context which determined the blizzard, the authors have revised the synoptic maps of air-pressure topography at the 500 hPa and ground levels and the meteorological data which were extracted from [www.wetter3.de](http://www.wetter3.de), [www.ogimet.com](http://www.ogimet.com), [www.sat24.com](http://www.sat24.com), [www.zamg.ac.at](http://www.zamg.ac.at), [www.weather.uwyo.edu](http://www.weather.uwyo.edu).

On 25-26 October 2014, the air flight activity was disturbed by the unexpected blizzard conditions and the Air Operators were taken by surprise and the Emergency and Rescue Air Unit (SMURD) could not intervene. Also, the military helicopters were not able to fly in transport missions to Carei (Satu Mare county) where there is the commemoration of the Romanian Army Day and the high officials of the Romanian state which were taking part have arrived with military aircrafts (C-27J Spartan, C-130B Hercules, An-30). After this event, at the landing on Otopeni Military Aerodrome they encountered severe meteorological hazard, but the aircrafts landed in safety conditions.

**Keywords:** blizzard, October, air-pressure field configuration, impact, air-flights.

## 1. INTRODUCTION

The South-Eastern part of Romania overlaps with the Eastern part of the Romanian Plain, situated between the Black Sea and the Curvature of the Carpathians (\*\*\*) *Geografia României*, vol V, 2005). Romania has a temperate continental climate (\*\*\*) *Clima României*, 2008), with warm and dry summers and cold winters. Among the weather risk phenomena which occur in the cold season, the blizzard is the most complex one, the South-Eastern part of Romania being the place with the highest annual number of blizzard days, more than 9 days in Baragan (Bălescu and Beșleagă, 1962, *Clima României*, 2008).

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The occurrence of blizzard and related meteorological phenomena disturb the majority of economic sectors, with a higher impact on air activities. In order for an aircraft to fly safely the meteorological conditions must be favourable. This is why the forecasting of weather risk phenomena is primary.

On a calendar basis, October is considered the middle month of the fall, statistically the multiannual mean of blizzard days (in South-Eastern Romania) in this month is 0 days. A climatological analysis on a period of 50 years (1961-2012) shows two cases with the earliest snow occurring on 15 October 1970 and the first snow cover on 26 October 1988, but there was no blizzard. Therefore the blizzard episode from 25-26 October 2014 can be considered the earliest blizzard in a climatological database. Previous research (Bălescu and Beșleagă, 1962) shows that blizzard phenomenon was present in the month of November with 0-1 days, when the multi-annual average is 0.4 days.

The general synoptic context of the atmosphere has determined a thermo-baric contrast in the last decade of October which led to a wintry aspect of the weather with lower temperatures than the climatological norm. Starting from these premises, the synoptic analysis of the air-pressure field configuration that determined the blizzard during 25-26 October 2014 could be illustrative for the irregular pattern of occurrence of this weather hazard.

The air-pressure field configuration that favored this poor weather in October was normal, sudden contact between a mass of warm and moist air from the Mediterranean Sea and a mass of cold and dry polar air from the North. The intensity of the blizzard was caused by the thermo-baric horizontal and vertical gradient which was very high.

Because of the poor weather conditions (strong wind and heavy rain and snow precipitation) on 25 October the air flight activity was disturbed when the military helicopters were not able to fly in transport missions and helicopters from Emergency and Rescue Air Unit (SMURD) could not intervene. The present study will climatologically and meteorologically analyze the blizzard episode from 25-26 October and its implications in aviation activities.

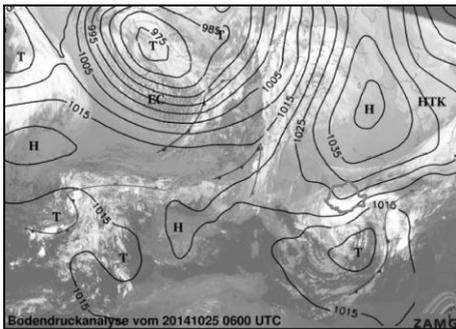
## **2. DATA AND METHODES**

The climatological analysis of the blizzard phenomenon was based on the meteorological data from Otopeni, Baneasa, Sibiu and Satu Mare airports. The data were carefully selected, covering only periods of time when the three aircrafts took-off and landed on Otopeni military aerodrome and the blizzard phenomenon was strong and contain information about horizontal visibility, cloud cover, weather phenomenon, maximum and average wind speed and the direction of the maximum gust, temperature, air pressure and runway contamination.

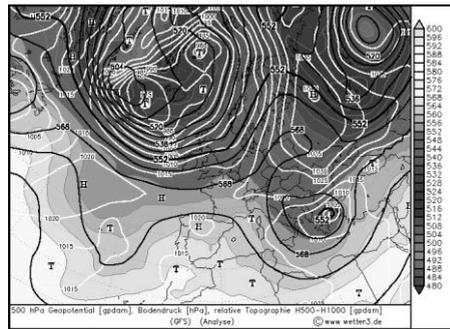
The synoptical analysis of the blizzard episode from 25-26 October 2014 was made based on maps with the air pressure at sea level, satellite and radar images, the distribution of geopotential field at 500 hPa provided by specialized websites ([www.wetter3.de](http://www.wetter3.de), [www.sat24.com](http://www.sat24.com), [www.zamg.ac.at](http://www.zamg.ac.at); etc).

### 3. SYNOPTICAL ANALYSIS

On 25 October 2014 (Fig. 1, 2), there was a cyclonic area form Iceland above Northern Europe with minimum values of 975 hPa and a high-pressure area (East-European Anticyclone) with maximum values of 1040 hPa in the North-East. The Southern part of Europe was under the influence of the Mediteranean Cyclone centered above the Balkan Peninsula, South of Danube river, with values of 1010 hPa. This air-pressure field configuration that favoredized this poor weather in October was normal, sudden contact between a mass of warm and moist air from the Mediterranean Sea and a mass of cold and dry polar air from the North.

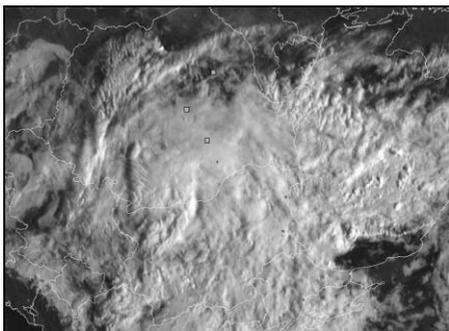


**Fig. 1. The surface map**  
**25.10.2014, 06:00 UTC**  
*source: www.zamg.ac.at*

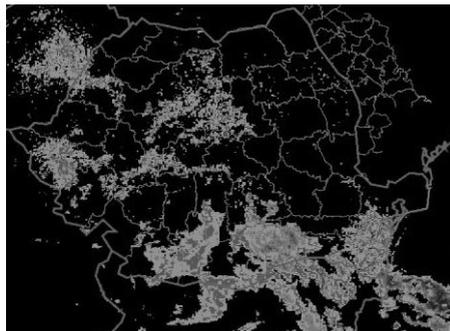


**Fig. 2. The geopotential map (500 hPa)**  
**25.10.2014, 00:00 UTC**  
*source: www.wetter3.de*

The general synoptic context of the atmosphere has determined a thermo-baric contrast in the last decade of October which led to a wintry aspect of the weather with lower temperatures than the climatological norm, with heavy precipitation (first rain and then snow) and strong wind (Fig. 3, 4). Starting from these premises, the synoptic analysis of the air-pressure field configuration that determined the blizzard during 25-26 October 2014 could be illustrative for the irregular pattern of early occurrence of this weather hazard.

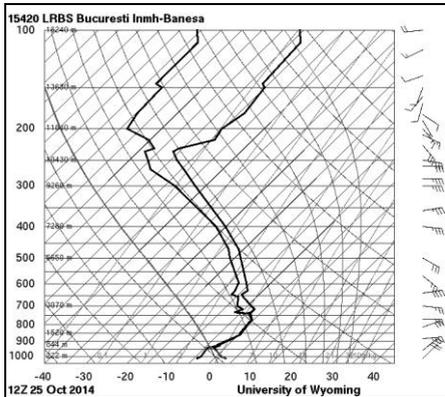


**Fig. 3. Satellite image, SE Europe**  
**25.10.2014, 14:50 UTC**  
*source: www.sat24.com*



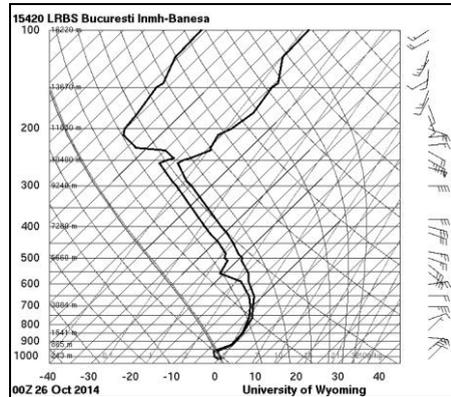
**Fig. 4. Radar image, Romania**  
**25.10.2014, 14:39 UTC**  
*source: www.meteoromania.ro*

The Skew T-log P diagrams for Bucharest Baneasa from 25 October 2014 12 UTC and 26 October 2014, 00 UTC, show warm air in the low troposphere (600-2000 m) and medium troposphere (3000-5000 m) which produced precipitations at the surface. The vertical wind profile shows a circulation mainly from the North-East at surface and windshear which is specific to the blizzard and to the anti-cyclonic activity through the airflow from North-East (Fig 5, 6).



**Fig. 5. Radiosounding diagram from Bucuresti Baneasa, 25.10.2014 12 UTC**

source:<http://weather.uwyo.edu/upperair/sounding.html>



**Fig. 6. Radiosounding diagram from Bucuresti Baneasa, 26.10.2014 00 UTC**

#### 4. THE ANALYSIS OF THE PHENOMENA AND ITS IMPACT ON AIR FLIGHTS

On 25 October, on Romanian Army Day, the high officials of the Romanian state were supposed to arrive at Carei (Satu Mare county) for the commemorative activities. The military helicopters were not able to fly in transport missions to Carei (Satu Mare county) because the forecasts (TAF – Terminal Aerodrome Forecast) and weather warning alerted that in the second half of the day the weather would worsen. Although in the morning the weather was favorable (METAR - Meteorological Aerodrome Report) for flight missions with the helicopters, because of the weather warnings and severe meteorological hazard, the flight mission was executed with three military aircrafts from Otopeni Airlift Base (C-27J Spartan, C-130B Hercules, An-30). At take off and on the flight route (Otopeni-Sibiu-Satu Mare) there were good weather conditions.

The forecast from Otopeni indicated worsening weather conditions for landing, with strong wind and hazardous weather phenomena (blizzard).

**TAF LROP 251100Z 2512/2612 06020G30KT 9999 OVC025 BECMG 2513/2515 5000 RA BR BKN015 OVC020 TEMPO 2515/2517 3000 RASN BKN010 OVC020 BECMG 2517/2519 06020KT 3000 SN BKN010 OVC020 PROB30 2520/2602 1500 SHSN BKN005 SCT020CB BECMG 2606/2608 NSW=**

After the commemorative activities have finished, the military aircrafts took off around 17:00 LT from Satu Mare airport and landed on Otopeni military aerodrome between 18:00-18:30 LT. During the landing procedure the weather worsen, the blizzard severely diminished visibility to such an extent that landing was very difficult (strong wind and heavy snow). Also the blizzard was a serious threat after the landing for ground maneuvers (snow contaminated taxiways).

#### 4.1 Weather conditions at landing (Otopeni military aerodrome)

At the Otopeni military aerodrome at landing (18:10 LT), there were the following meteorological conditions: wind direction 040 degrees, speed 19 knots, poor horizontal visibility 800 m, phenomenon heavy shower snow, scattered clouds (3-4/8) at 120 m, broken Cumulonimbus clouds (5-7/8) at 150, 600 m, overcast (8/8) at 750 m, air temperature 1°C, dew point 0°C, air pressure 1026 hPa, temporarily horizontal visibility decreases at 600 m with heavy shower snow, runway contamination: runway coverage 51-100% with a dry snow layer of 1 mm.

**METAR LROP** 251500Z 04019KT 0800 R08R/1400VP2000U R26L/2000U R08L/1700VP2000U R26R/1400VP2000U +SHSN SCT004 BKN005 BKN020CB OVC025 01/00 Q1026 TEMPO 0600 +SHSN R88/590194=

Although the meteorological conditions were severe during the landing procedure, the flight and landing of the aircrafts were accomplished in safety conditions.

The blizzard episode continued on the next day, disturbing the air traffic on Otopeni and Baneasa airports, causing delays (1-2 h, TAROM, Alitalia), but there was no canceled flight. Also, because of the poor weather, the military helicopters and the Emergency and Rescue Air Unit (SMURD) could not perform (Fig. 7).

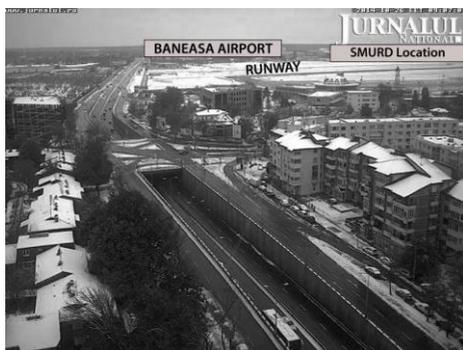


Fig. 7. Webcam Antena 1-DNI, 26.10.2014, 09:07 LT ([www.jurnalul.ro](http://www.jurnalul.ro))

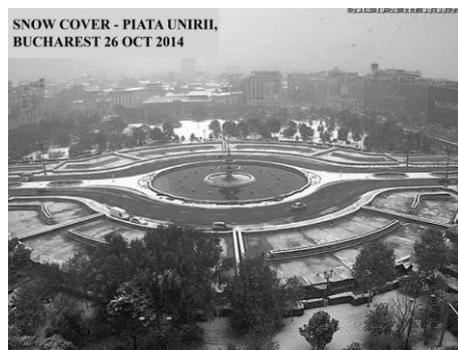


Fig. 8. Webcam Piata Unirii, 26.10.2014, 08:08 LT ([www.jurnalul.ro](http://www.jurnalul.ro))

The blizzard episode from 25-26 October 2014 was the earliest blizzard in a climatological database, with a significant snow cover for this period (Fig. 8).

## 5. CONCLUSIONS

October is not a representative month for the blizzard phenomenon, on a calendar basis it is considered the middle month of the fall, statistically the multiannual average of blizzard days (in South-Eastern Romania) in this month is 0 days. A climatological analysis on a period of 50 years (1961-2012) shows two cases with the earliest snow occurring on 15 October 1970 and the first snow cover on 26 October 1988, but there was no blizzard. Therefore the blizzard episode from 25-26 October 2014 can be considered the earliest blizzard in a climatological database.

Flying in blizzard conditions (low visibility, strong wind and heavy snow) is mainly difficult because of the impossibility of orientation after landmarks and pilots may be given a false sense of security. Blizzard is a serious threat at take-off, during the landing approach procedure, at landing, but also for the ground maneuvers (taxiways), because untreated taxiways and runways may be covered with snow, thus amplifying the risks.

Blizzard is a serious weather hazard in aviation and can cause great damages on the ground and severely diminish visibility, sometimes to such an extent that take-off and landing may become impossible.

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