GEN 3.5 METEOROLOGICAL SERVICES

1. Responsible service

The “Federal Office for Meteorology and Climatology”, MeteoSwiss, is designated as the meteorological authority for the provision of the aeronautical meteorological service for civil aviation in Switzerland under the supervision of the “Federal Office for Civil Aviation”.

Post: Federal Office for Meteorology and Climatology, MeteoSwiss
Operation Center 1
P.O. Box
CH-8058 Zürich-Flughafen
Phone: +41 (0) 58 460 91 11
Fax: +41 (0) 58 460 90 91
Email: fwinfo@meteoswiss.ch
AFS: LSSWYMYX
URL: http://www.meteoswiss.ch

For administrative matters, the service can be reached during office hours.

Applicable ICAO documents for the service.

ICAO Annex 3, Meteorological Service for International Air Navigation. The differences are listed in the supplements of ICAO Annex 3.
ICAO DOC 7030, Regional Supplementary Procedures
ICAO Air Navigation Plan, European Region, Part VI, Meteorology

2. Area of responsibility

The MeteoSwiss Centre for Forecasting and Aviation Meteorology at Zurich Airport is the designated meteorological watch office (MWO) for Switzerland FIR/UIR (LSAS).

3. Meteorological observations and reports

Name of station/ Location indicator	Type and frequency of observation/ automatic observing equipment	Types of MET reports & Supplementary information included	Observation System and Site(s) [1]	Hours of operation	Climatological information
1	2	3	4	5	6
Bern-Belp LSZB [2]	h	PL, METAR	SMART [4]	HX	AVBL [5]
Buochs LSZC [2]	h	METAR	SMART [4]	HX	
Genève [3] LSGG	h, S	PL, METAR, TREND	SMART [4]	H24	AVBL [5]
Zurich [3] LSZH	h, S	PL, METAR, TREND, VWS	System for detection of sustained low level vertical wind shear in the surroundings of the aerodrome, SMART [4]	H24	AVBL [5]
Les Eplatures LSGC [2]	h	PL, METAR	SMART [4]	HO	

H = hourly
h = half-hourly
S = special observation
PL = report in plain language broadcasted
VWS = warning of sustained vertical wind shear

1. **see § 3.1 for details**
2. **Observations delegated to third-party (ATC, aerodrome operator)**
3. **Observations made by automatic observing system during non-operational hours of the aerodrome. Visibility reported in AUTO reports is based on MOR (Meteorological Optical Range) measurement. TREND is appended from remote to AUTO reports.**
4. **SMART, an integrated system used by the MET observer**
5. **Aeronautical Climatological Information: published as "Technical Report" and available as free download on www.meteoswiss.ch; search for "aeronautical climatological information".**

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1	2	3	4	5	6
Grenchen LSZG [2]	h	PL, METAR	SMART [4]	HX	AVBL [5]
Lugano LSZA [2]	h	PL, METAR	SMART [4]	HO	AVBL [5]
St. Gallen-Altenrhein LSZR [2]	h	PL, METAR	SMART [4]	HX	AVBL [5]
Sion LSGS [2]	h	PL, METAR	SMART [4]	HO	AVBL [5]
Samedan LSZS [2]	h	PL, METAR	SMART [4]	HO	

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3.1 Surface wind

3.1.1 Genève airport

Surface wind is measured in the proximity (N) of TDZ 22, in the middle of the RWY (N) near the HEL PRKG and in the proximity (N) of TDZ 04, each at a height of 10 m AGL. Displays of wind direction and wind speed are located at the aeronautical meteorological station-, the aerodrome meteorological office as well as in the relevant ATC unit. Recording of the measurements is provided.

3.1.2 Zurich airport

For landings on RWY 14 and RWY 16, the wind is measured between RWY 14 and RWY 16 at a height of 10 m AGL. This wind is also broadcasted in the METAR and by DEP ATIS. This wind is also broadcasted on ARR ATIS depending on the RWY in use.
For landings on RWY 34, the wind is measured in the proximity (W) of TDZ 34 at a height of 10 m AGL. This wind is broadcasted on ARR ATIS depending on the RWY in use.
For landings on RWY 28, the wind is measured in the proximity (N) of TDZ 28 at a height of 10 m AGL. This wind is broadcasted on ARR ATIS depending on the RWY in use.
Displays for wind direction and speed are located at the aeronautical meteorological station and the aerodrome meteorological office, in the briefing room of the aerodrome meteorological office as well as in the relevant ATC units. Recording of the measurements is provided.

3.1.3 Lugano airport

Surface wind is measured at the GP/DME station RWY 01 at a height of 10 m AGL.

3.1.4 Bern-Belp airport

The wind is measured in the vicinity of both ends of the RWY at a height of 10 m AGL.

3.1.5 St. Gallen-Altenrhein airport

The wind is measured in the vicinity of both ends of the RWY at a height of 10 m AGL.

3.1.6 Les Eplatures airport

The wind is measured in the vicinity of the mid-section of the RWY at a height of 10 m AGL and on the TWR roof.

3.1.7 Sion airport

The wind is measured in the vicinity of both ends of the RWY at a height of 10 m AGL.

3.1.8 Grenchen airport

The wind is measured in the vicinity of the mid-section of the RWY at a height of 10 m AGL.

3.1.9 Buochs airport

The wind is measured in the vicinity of the end of RWY 25 at a height of 10 m AGL.

3.1.10 Samedan airport

The wind is measured in the vicinity of both ends of the RWY at a height of 10 m AGL.

3.2 Visibility

The prevailing visibility is reported by human observes in accordance with the SARPs of ICAO Annex 3, including the minimal visibility and its sector, if conditions are met. Visibility reported in AUTO reports for regional aerodromes is based on MOR (Meteorological Optical Range) measurement.

3.3 Determination of Runway Visual Range (RVR)

3.3.1 General

Transmissometers (TMM) are used for the assessment and automatic transmission of the runway visual range (RVR) at Genève and Zurich airports. In Bern-Belp and St. Gallen-Altenrhein, calculator-equipped forward scatter sensors are in use. In case of malfunction or when the TMM are out of service, the MET observer will determine the RVR by means of technical equipment (counting the runway edge lights by means of television cameras) in Genève (for the touch-down zone of RWY 22 only) and Zurich (for the touch-down zone of RWY 14 only).
In addition to the live transmissions provided to ATC services, RVR values are available in the briefing room of the aerodrome meteorological office at Zurich.
Values broadcasted by the air traffic controller on the TWR frequencies are based on the actual runway light setting in use. According to the local requirements of the ATC, different calculation rules are applied for runway light setting at a low level:

- In Zurich and Genève, during periods with 0%, 1% and 3% runway light setting, these RVR values are calculated with a runway light setting of 100%.
- In Bern-Belp and St. Gallen-Altenrhein, during periods with 0%, 1% and 3% runway light settings, these RVR values are calculated with the actual light setting.

3.3.2 Reporting scales

The reporting scales comply with the SARPs in ICAO Annex 3.
The reporting scales are:

from	50 m	to	400 m	in increments of	25 m
from	400 m	to	800 m	in increments of	50 m
from	800 m	to	2000 m	in increments of	100 m

Upper limit for the reporting is 2000 m, lower limit is 50 m.

3.3.3 Procedures for air traffic control service

The RVR (1-minute averages, updated every 15 seconds) values will be transmitted on the relevant working frequencies by Approach Control Office (APP) and Aerodrome Control Tower (TWR).
ATC does not require acknowledgment of receipt of these messages.

3.3.4 Genève airport

The locations of the TMM are indicated on the Aerodrome Chart Genève 1:13'000, LSGG AD 2.24. The baseline lengths of the instruments are 30 m.

3.3.5 Zurich airport

The locations of the TMM are indicated on the Aerodrome Chart Zurich 1:17'000, LSZH AD 2.24. The baseline length of the instruments is 30 m.

3.3.6 Bern-Belp airport

One forward scatter sensor is located near the glide path in the vicinity of the touch-down zone of RWY 14.
The RVR values are not monitored by other means.

3.3.7 St. Gallen-Altenrhein airport

One forward scatter sensor is located near the glide path in the vicinity of the touch-down zone of RWY 10.
The RVR values are not monitored by other means.

3.4 Clouds base

3.4.1 General

Clouds of operational significance are reported respecting orographic restrictions and local operational requirements. More specific details can be found in the quick reference guide referred to in 4.5 below. In automatic reports the cloud base and cloud amount is calculated based on ceilometer measurement only. Cloud type (CB/TCU) in automatic reports is derived from real-time lightning measurement.

3.4.2 Genève airport

The cloud base and cloud amount is measured by means of ceilometers.
RWY 22: One ceilometer is located at the observation station 200 m S of THR 22, another 1000 m before THR 22 on the EXTD RWY CL.
RWY 04: One ceilometer is located N of the THR 04, another 750 m before THR 04 on the EXTD RWY CL.
A cloud search light is located 400 m W of the observation station, another at 186 m WSW of this station.

3.4.3 Zurich airport

The cloud base and cloud amount is determined by ceilometers at the following sites:

Name	Location	Mainly relevant for RWY
Hochfelden	Axis RWY 16 D4.3 KLO	14/16
MM	Axis RWY 16 approx. 1200 m NNW of THR 16	14/16
14/16	Between THR 14 and THR 16	14/16
Kloten	Axis RWY 28 approx. 800 m E of THR 28	28
Bassersdorf	Axis RWY 28 D2.9 KLO	28
34	Axis RWY 34 approx. 1000 m SSE of THR 34	34
Wallisellen	Axis RWY 34 D2.5 KLO	34

A cloud searchlight is located 650 m W of RWY THR 14 and another between RWY 14 and RWY 16.

3.4.4 Lugano airport

The cloud base and cloud amount is determined by ceilometers. One ceilometer is located near GP 01. Another ceilometer is located 3600 m NE of the ARP in the approach path of circling C.

3.4.5 Bern-Belp airport

The cloud base and cloud amount is determined by ceilometers. One is located 1660 m NW of the ARP, another at 1090 m E of the ARP.

3.4.6 St. Gallen-Altenrhein airport

The cloud base and cloud amount is determined by a ceilometer located 160 m W of THR RWY 10.

3.4.7 Les Eplatures airport

The cloud base and cloud amount is determined by a ceilometer located at approximately 950 m before THR RWY 24.

3.4.8 Sion airport

The cloud base and cloud amount is determined by ceilometers located at both ends of the RWY.

3.4.9 Grenchen airport

The cloud base and cloud amount is determined by a ceilometer located S of mid-section of the RWY.

3.4.10 Buochs airport

The cloud base and cloud amount is determined by ceilometer located at the end of RWY 06.

3.4.11 Samedan airport

The cloud base and cloud amount is determined by a ceilometer located on the roof of the TWR building.

3.5 Temperature

The temperatures are measured using radiation protection 2 m AGL. Back-up sensors that are in use during contingency procedures or under fallback conditions are located higher than 2 m AGL.

3.6 Vertical wind shear

3.6.1 Zurich airport

Gradual changing wind shears in inversion conditions as well as low-level wind shear in approach and climb-out will be measured by means of the SMART system. Corresponding information concerning inversions and/or wind shears will be broadcasted via ATIS.

3.6.2 Genève airport

Not measured.

3.7 AIREP

3.7.1 Special aircraft observations

The following meteorological conditions within FIR Switzerland - if encountered in-flight unexpectedly - shall be reported via voice to the appropriate air traffic service unit as soon as practicable in the form of "special air-report" (ARS) when encountered or observed:

1. moderate or severe turbulence; or
2. moderate or severe icing; or
3. severe mountain wave; or
4. thunderstorms, without hail, that are obscured, embedded, widespread or in squall lines; or
5. thunderstorms, with hail, that are obscured, embedded, widespread or in squall lines; or
6. volcanic ash cloud

3.7.2 Other non-routine aircraft observations

The following meteorological conditions in approach or climb-out - if encountered unexpectedly - shall be reported to the appropriate air traffic service unit as soon as practicable via voice communication when encountered:

1. moderate or severe wind shear; or
2. moderate or severe turbulence; or
3. moderate or severe icing

3.7.3 Post-flight reporting of volcanic activity

Post-flight reports on volcanic ash shall be sent to the Meteorological Watch Office (MWO) by
Email: flugwetter@meteoswiss.ch

4. Types of services

At Zurich airport, the aerodrome meteorological office is located in the Operation Centre 1 and manned 24/7. Data from the world area forecast system (WAFS), OPMET data as well as local MET products are also available via self-briefing system. At other Swiss aerodromes, pilots may request meteorological information needed for their flights by telephone from the aerodrome meteorological office in Geneva or Zurich or retrieve them from available self-briefing systems.

4.1 For visual flights, daily weather forecasts will be issued as follows:

- Low-Level SWC (Significant Weather Chart) Alps including W/T-Chart, Wind-Barbs, QNH Chart;
- GAFOR-Switzerland;
- Meteorological information for GLD FLT-Switzerland;
- Aviation weather forecast

4.2 Aviation weather forecast:

Issue hour	Validity
0500 UTC	0600-1200 UTC
1030 UTC	1200-1800 UTC

The aviation weather forecast gives information regarding:

- the general weather situation;
- clouds, visibility and weather **for the region of Switzerland;**
- wind and temperature for Payerne, Lugano and Zurich for selected levels up to 53’000 ft, tropopause level, wind maximum (60 kt or more) and zero degree isotherm;
- hazardous weather phenomena;
- weather changes till midnight;
- forecast for the next 3 days

4.3 Low-Level SWC Alps, W/T-Chart, Wind-Barbs, QNH-Chart

4.3.1 General Information

The Low-Level SWC (Significant Weather Chart) Alps is an area forecast for hazardous weather phenomena, which may affect the safety of low-level flights, assigned for the FIR Switzerland and FIR Wien and the adjacent countries. The Low-Level SWC includes all significant phenomena, which justify the issuance of an AIRMET. Therefore no AIRMET will be published anymore (exception see 8). The chart covers the layer between the ground and FL 250 and will be issued every 4 hours. The Low-Level SWC is monitored continuously and amended as required. Outside FIR Switzerland and FIR Wien the weather forecast depicted on the chart is for information only and without any liability on the part of MeteoSwiss and AustroControl. For a briefing outside Switzerland and Austria it is therefore mandatory to use the official national weather products of those areas.
The Low-Level SWC is being supplemented by upper wind information in form of values ("W/T-Chart") and wind barbs ("Wind-Barbs") as well as QNH-values ("QNH-Chart").

4.3.2 Format

The chart is composed of:

- a topographical map with borders as background supplemented with the symbols describing the weather situation valid for a certain time (visible in the heading part: "CHART VALID AT"). Help to the used symbols can be found in the brochure "Flugwetterinformationen in der Schweiz", downloadable under www.meteoschweiz.ch/aviatik.
- a heading part containing the validity time (for the graphical content of the map itself), the outlook validity time (for the written information in the lower right corner) and the time of issuance. In the case the chart has been amended, the words “AMD DUE TO” together with the reason for it appears.
- an outlook part in the lower right corner with the forecast in written form for the next 4 hours after the validity time.

The following weather information is forecasted in the Low-Level SWC Alps:

- High and low pressure centres including movement and development.
- Fronts including movement and development.
- Adverse weather areas characterised by widespread BKN/OVC clouds with cloud base 6000 ft MSL or below, visibility below 8 km, widespread precipitation, or OCNL/FRQ/SQL/OBSC/EMBD CB or TCU.
- Convective clouds (CB, TCU).
- Other areas of clouds below FL250 inclusive height, type and amount.
- Mountain obscuration.
- Prevailing visibility.

The following hazardous weather phenomena are forecasted in the Low-Level SWC Alps:

- Drizzle, Rain, Freezing Drizzle, Freezing Rain, Snow Grains, Snow, Ice Pellets, Showers of Rain/Snow/Hail, Thunderstorm with Rain/Snow/Hail.
- Fog, Freezing Fog, Mist, Dust- and Sandstorm, Smoke, Blowing or Drifting Snow.
- Ice, Turbulence, Mountain Waves.
- Areas with strong surface winds and gusts below.

4.3.3 Schedule

Every 4 hours two Low-Level SWC are issued. The first chart with a validity time of 2 hours, the second chart with a validity time of 6 hours after the time of issuance. The outlook covers the extended time period for the following 4 hours after the time of issuance.

Time of issuance (in UTC)		Validity (in UTC)	Outlook (in UTC)
0000	Chart 1 Chart 2	0200 0600	0200 - 0600 0600 - 1000
0400	Chart 1 Chart 2	0600 1000	0600 - 1000 1000 - 1400
0800	Chart 1 Chart 2	1000 1400	1000 - 1400 1400 - 1800
1200	Chart 1 Chart 2	1400 1800	1400 - 1800 1800 - 2200
1600	Chart 1 Chart 2	1800 2200	1800 - 2200 2200 - 0200
2000	Chart 1 Chart 2	2200 0200	2200 - 0200 0200 - 0600

4.4 GAFOR

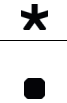
Time of issuance (UTC)	Validity (UTC)	Time segments (UTC)		
0345 (during central European summer time CEST)	0400-1000	0400-0600	0600-0800	0800-1000
0545 (during regular central European time CET)*	0400-1000	/	0600-0800	0800-1000
0745	0800-1400	0800-1000	1000-1200	1200-1400
1145	1200-1800	1200-1400	1400-1600	1600-1800
1545 (during central European summer time CEST)*	1600-2200	1600-1800	1800-2000	/

*The formal period of validity of a GAFOR is always 6h to maintain the same code format (text version) and layout (chart version) throughout the day. For practical reasons the first 2 hours segment of the first GAFOR during regular time and the last 2 hours segment of the last GAFOR during summertime contain no weather information but only a "/".To provide the latest information available, the first GAFOR during regular time is published after the regular start of its validity period.

The GAFOR comprises the route identification and the forecast for visibility in kilometres as well for ceiling (ceiling of 5/8 and above). The conditions are forecasted in the form of classes (O/D/M/X) for each time segment. The definitive GAFOR class is defined by the least visibility and ceiling on the corresponding GAFOR route (incl. start and end point).

Weather categories					
Ceiling					
2000 ft	**X**	**M**	**D**	**O**	Oscar / open
1500 ft	**X**	**M**	**D**	**D**	Delta / difficult
1000 ft	**X**	**M**	**M**	**M**	Mike / marginal
	X	**X**	**X**	**X**	X-Ray / closed
	2 km	5 km	8 km		**Visibility**
Ceiling: Lowest cloud base of at least 5 oktas (BKN/OVC)					

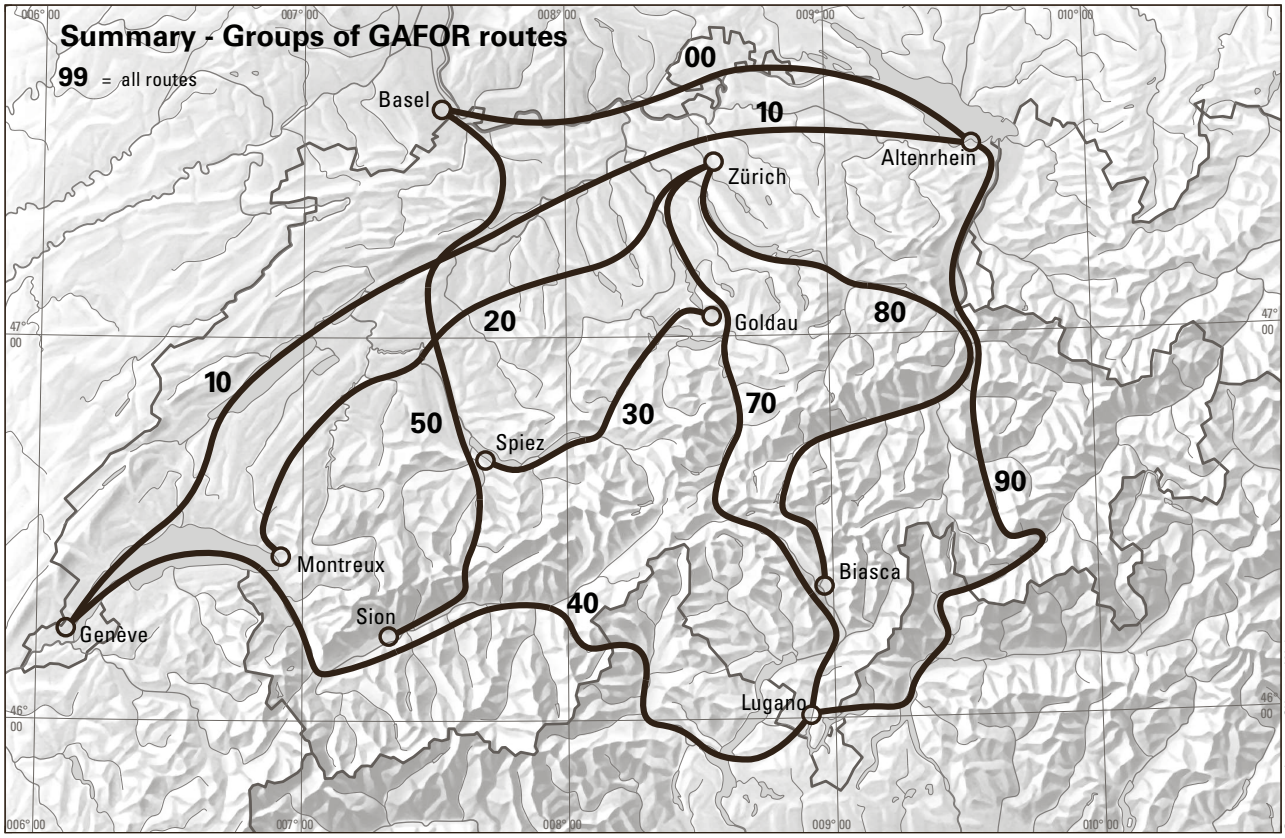
For all weather categories except "O", the meteorological reason for the reduction of visibility and/or the low ceiling is indicated by the most relevant phenomenon from the following table:

Symbol	Phenomenon
	Thunderstorm
	Snow
	Rain
	Showers of Snow
	Showers of Rain
LC	Low Clouds
	Fog
	Mist

Other weather phenomena hazardous to aviation, such as icing and turbulence are forecasted in the Low-Level SWC Alps or aviation weather forecast. They are not taken into account in GAFOR.

4.4.1 GAFOR Routes (groups)

Groups of routes	Reference level AMSL (Highest point of a route)
00 Basel-Schaffhausen-Altenrhein	*1600 ft*
10 Genève-Grenchen-Zürich-Altenrhein	*1900 ft*
20 Montreux-Bern-Zürich	*2900 ft*
30 Spiez-Meiringen-Brünig-Goldau	*3600 ft*
40 Genève-Simplonpass-Domodossola-Lugano	*6800 ft*
50 Basel-Gemmipass-Sion	*7700 ft*
70 Zürich-Gotthardpass-Lugano	*7200 ft*
80 Zürich-Lukmanierpass-Biasca	*6500 ft*
90 Altenrhein-Julierpass-Malojapass-Lugano	*7500 ft*
99 All routes	*7700 ft*



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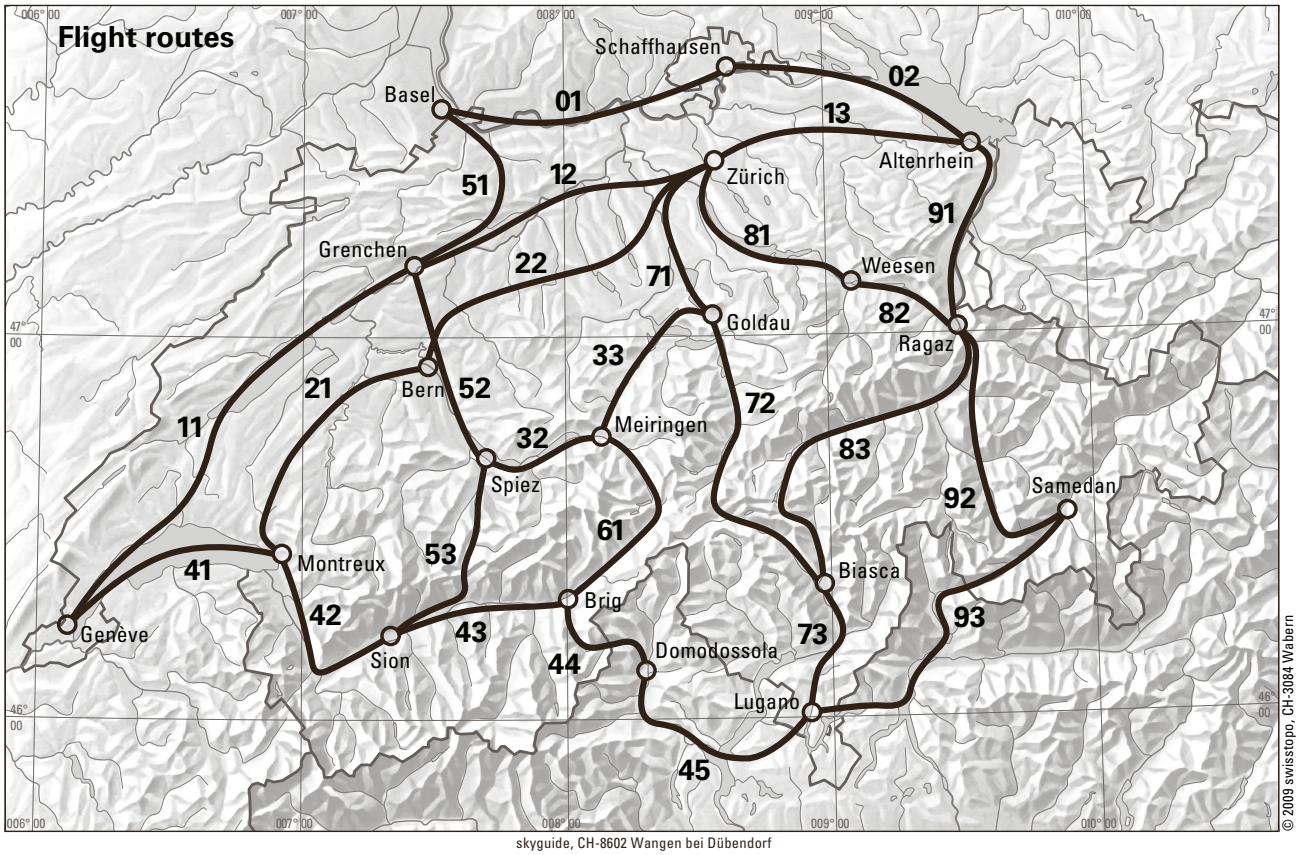
4.4.2 GAFOR routes (single)

Flight routes	Reference level *AMSL*	Flight routes	Reference level AMSL
01 Basel-Schaffhausen	*1600 ft*	51 Basel-Langenbruck-Grenchen	*2600 ft*
02 Schaffhausen-Altenrhein	*1600 ft*	52 Grenchen-Bern-Spiez	*1900 ft*
11 Genève-Morges-Grenchen	*1900 ft*	53 Spiez-Gemmipass-Sion	*7700 ft*
12 Grenchen-Bremgarten-Zürich	*1900 ft*	61 Meiringen-Grimselpass-Brig	*7200 ft*
13 Zürich-Attikon-Altenrhein	*1900 ft*	71 Zürich-Bremgarten-Goldau	*1900 ft*
21 Montreux-Romont-Fribourg-Neuenegg-Bern	*2900 ft*	72 Goldau-Gotthardpass-Biasca	*7200 ft*
22 Bern-Moossee-Sursee-Bremgarten-Zürich	*2900 ft*	73 Biasca-Lugano	*1900 ft*
32 Spiez-Meiringen	*1900 ft*	81 Zürich-Horgen-Weesen	*1600 ft*
33 Meiringen-Brünig-Küssnacht-Goldau	*3600 ft*	82 Weesen-Ragaz	*1600 ft*
41 Genève-Montreux	*1600 ft*	83 Ragaz-Lukmanierpass-Biasca	*6500 ft*
42 Montreux-Sion	*1600 ft*	91 Altenrhein-Ragaz	*1600 ft*
43 Sion-Brig	*2300 ft*	92 Ragaz-Lenzerheide-Julierpass-Samedan	*7500 ft*
44 Brig-Simplonpass-Domodossola	*6800 ft*	93 Samedan-Malojapass-Menaggio-Lugano	*6200 ft*
45 Domodossola-Laveno-Lugano	*1600 ft*		



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4.5 Service distribution

Meteorological information is available on site at the aerodromes (Self-briefing Station). They are also available by telephone and internet.

Quick reference:

A quick reference guide containing background information to the main aeronautical meteorological services and products is available for free from:
URL: http:// www.meteoschweiz.ch/aviatik

Telephone:

Service	German	French	Price
Personal flight briefing	0900 162 737	0900 162 767	CHF 2.90/Min
Aviation weather forecast	0900 162 121	0900 162 151	CHF 1.20/Min.
GAFOR	0900 162 120	0900 162 150	CHF 1.20/Min.
Glider forecast (April-September)	0900 162 122	0900 162 152	CHF 1.20/Min.

Internet:

Service	Website	Price
Internet briefing Alpine region and more	www.flugwetter.de	CHF 85.- / Year
Internet flight preparation	www.skybriefing.com	Depending on service and access time

5. Notification required from operators

5.1 Notification to obtain meteorological service

For the provision of meteorological information to be used by scheduled flights, a prior notification of 2 months is required. For non-scheduled flights, notification 24 hours in advance of the hour of meteorological briefing is required.

6. Aircraft reports

Reporting requirements see § 3.7 AIREP

7. VOLMET service

METEOROLOGICAL BROADCASTS								
Name	**Call Sign**	**EM**	**FREQ MHz**	**Broadcast period**	**Service HR**	**Stations**	**Contents**	**Remarks**
1	**2**		**3**	**4**	**5**	**6**	**7**	**8**
GENEVA	Geneva MET Broadcast	A3E	**126.805**	CNS	H24	Genève, Zurich, Bâle-Mulhouse, Nice, Lyon-Saint-Exupéry, Paris-Charles-de-Gaulle, Paris-Orly, Milan-Linate, Milan-Malpensa, Bern [1)]	AERODROME ROUTINE WEATHER REPORT	plain language - En. **VOLMET** + 41 (0) 22 417 40 82 [1)] AUTO METARs when AD is closed
ZURICH	Zurich MET Broadcast	A3E	**127.205**	CNS	H24	Zurich, Genève, Bâle-Mulhouse, Frankfurt/Main, Munich, Stuttgart Milan-Malpensa, Milan-Linate, Lugano [1)] Bern [1)]		plain language - En. **VOLMET** + 41 (0) 43 931 60 71 [1)] AUTO METARs when AD is closed

8. SIGMET and AIRMET service

AIRMET will only be issued in case of Low-Level SWC not being available due to technical reasons.

9. Other automated meteorological services

Meteorological information is provided automatically by telephone, mobile and Internet (see § 4.5).