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TERMINAL FORECAST REFERENCE NOTEBOOK FOR BITBURG AB, GERMANY.(U)
FEB 81
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TERMINAL FORECAST REFERENCE NOTEBOOK

FOR

BITBURG AB, GERMANY

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PUBLISHED BY
DETACHMENT 1
31ST WEATHER SQUADRON
2D WEATHER WING (MAC)
UNITED STATES AIR FORCE
4 FEBRUARY 1981

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This technical report has been reviewed and is approved for publication.

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PUBLIC AFFAIRS OFFICER

FOR THE COMMANDER

ADRIAN A. RITCHIE, JR., LT COL, USAF
CHIEF, AEROSPACE SCIENCES DIVISION

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Terminal Forecast Reference Notebook

Bitburg AB, Germany

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Prepared 15 Oct 80

SECTION 1

LOCATION AND TOPOGRAPHY

TOPOGRAPHY AND ITS INFLUENCE ON LOCAL WEATHER

Bitburg AB is located near 50°N latitude, at 1228 feet elevation, in the Eifel, a plateau region west of the Rhine and Northwest of the Mosel. The Eifel merges into the Ardennes, a hilly plateau covering much of Luxembourg and Eastern Belgium. Trier (elev. 443 feet) is on the Mosel, 12NM SSE of Bitburg AB. Southeast of the Mosel is the Hunsruck, another hilly plateau. Elevations in the these uplands reach 2300-2700 feet. The highest elevation near Bitburg is 2293 feet 17NM NNE of base. Flow from the southeast through west is upslope, with southwest flow the strongest upslope. Flow from the north and northeast is downslope.

The Bitburg area is characterized by rolling terrain covered by woodlands and cultivated fields and cut by deeply eroded river valleys. The base is on some of the highest terrain in the immediate area. Valleys and low areas, excellent fog generators, surround the base. Most significant is the Kyll Valley, some 550 feet deep, on the northeast-east edge of base.

The unique geographical situation of Western Europe greatly influences the local weather. The seas and oceans boardering Europe are remarkably warm for such high latitudes. Europe's principle mountain ranges are oriented east-west which allows maritime air masses to invade the entire land area creating a gradual transition in climatic zones from west to east. The mountain barrier across southern Europe prevents, to a great extent, warm Mediterranean air masses from reaching central Europe. The lack of a mountain barrier to the east allows continental air from Russia to occasionally spread into the local area. Maritime air flowing into our area from the west first meet higher terrain in the Ardennes-Eifel.

By Western European standards, Bitburg is remote. There are no major industrial areas in the local area. However, pollutants may be advected from the Ruhr, (50-110NM N-NNE), Frankfurt area (60-90NM E), or the Saar (35-50NM SSE).

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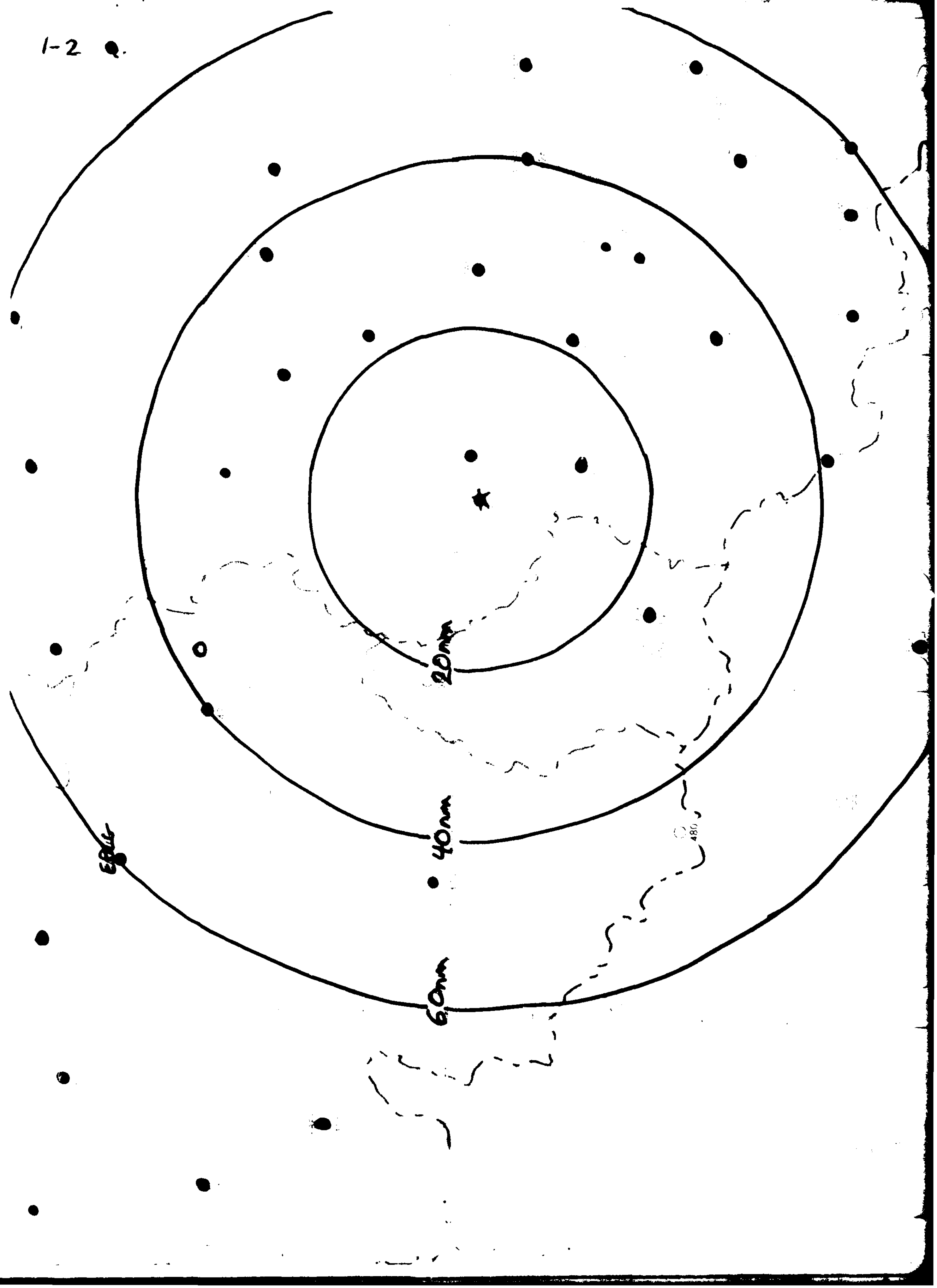

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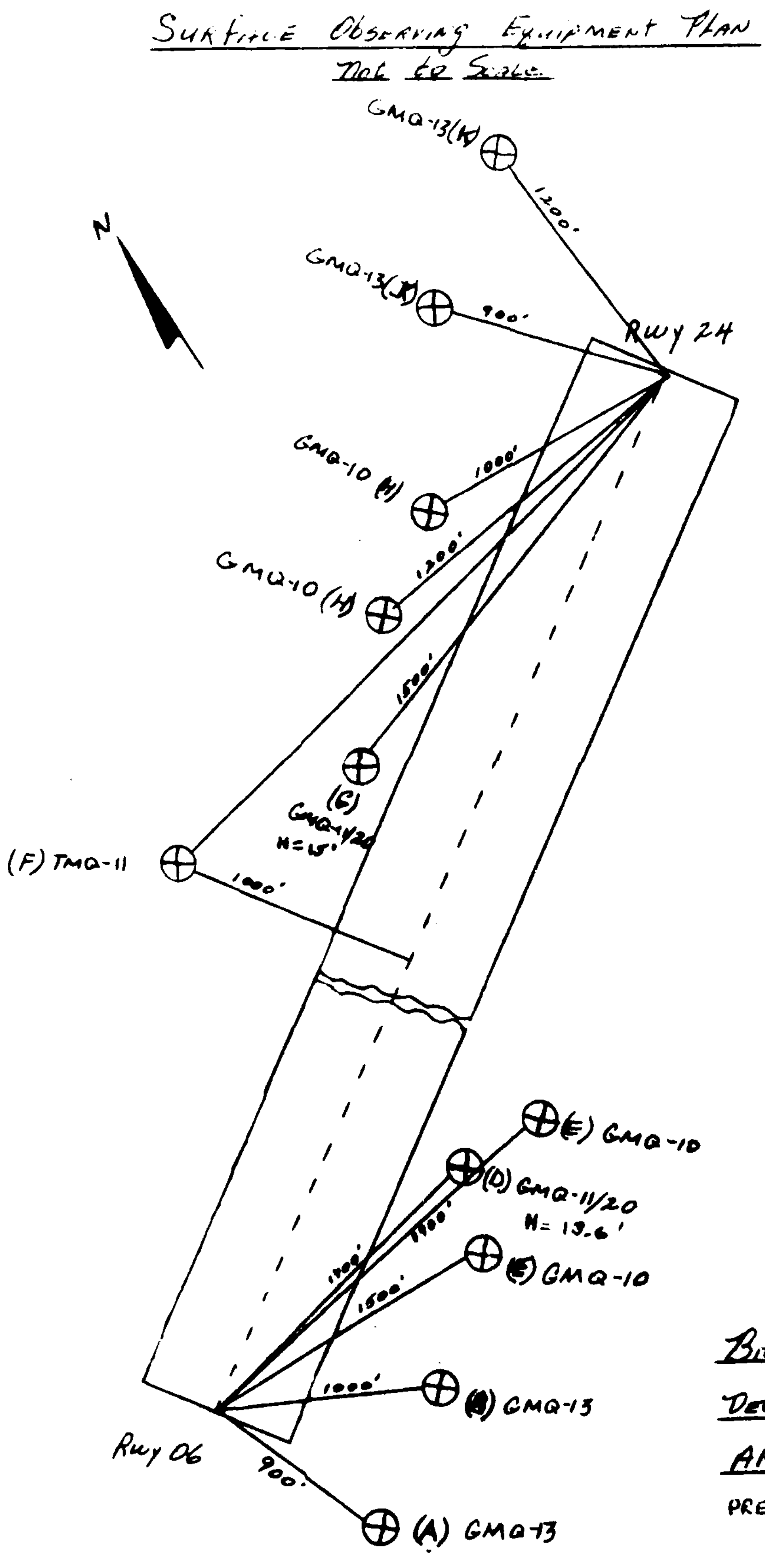

Bitburg AB, Germany
Det 1, 31 WEA SQ
APO 09132

PREPARED: 24 OCT 1975
BY MSgt BAKER

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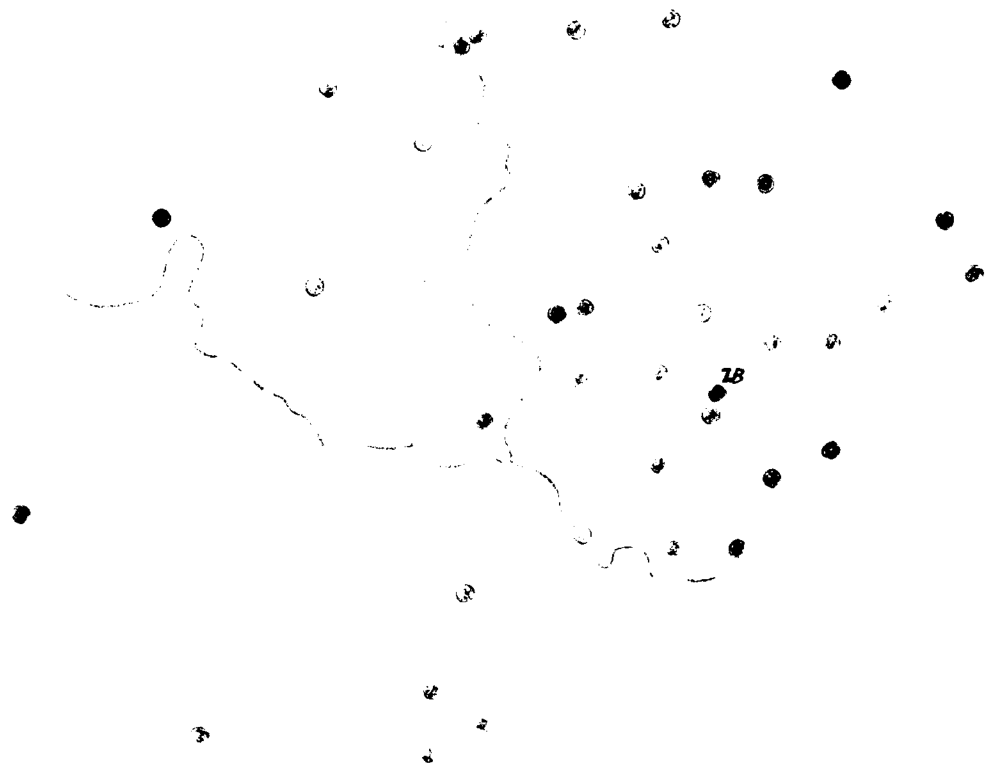
LOCATOR CHART AND WEATHER REPORTING STATIONS



STATION	ICAO	WMONO	ARQ	ELEV	UPSLOPE/LEE EFFECT SW	W	NW	N	NE	E	SE	S
Bitburg	EDAB			1228	sU	mU	--	--	nL	--	mU	sU
Spangdahlem	EDAD			1197	sU	mU	--	-	nL	--	sU	mU
Luxembourg	ELLX	06590	SI, SN	1234	mU	mU	--	--	--	-	--	--
Trier Petrisberg		10609	SI, SA	869	mU	mU	mU	--	--	nL	--	nL
Deuselbach		10615	SI, SA	1571	sU	sU	sU	mU	mU	-	--	--
Hann	EDAH			1650	mU	mU	--	mU	mU	--	--	--
Buchel	EDSB			1568	sU	mU	--	--	--	--	--	mU
Nurburg		10510	SI, SA	2053	sU	sU	mU	mU	mU	mU	sU	sU
Spa		06490	SI, SN	1590	--	sU	sU	mU	sU	mU	--	--
St. Hubert		06476	SI, SN	1847	sU	sU	mU	mU	--	nL	--	sU
Liege	EBLG			658	--	mU	mU	mU	--	--	nL	nL
Liege		06478	SI, SN	604	--	mU	mU	mU	--	--	nL	nL
Florennes	EBFS	06456	SI, SN	935	--	mU	mU	mU	mU	--	mU	--
Reims	LFSR	07070	SI	312	--	--	--	nL	--	--	mU	--
St. Dizier	LFSI	07169	SI	456	--	mU	--	--	--	--	--	--
Metz	LGSF	07090	SI	623	--	nL	nL	--	nL	--	--	--

STATION	ICAO	WMONO	ARQ	ELEV	SW	W	NW	N	NE	E	SE	S
Aachen		10501	SI SN	663	nL	mU	mU	mU	sU	--	--	nL
Aachen Merz.		10503	SI SA	623	nL	mU	mU	mU	mU	--	nL	nL
Norverich	EDNN	10502	SI	384	nL	mU	--	--	--	--	nL	nL
Köln/Bonn	EDDK	10513	SI	300	nL	mU	--	--	nL	nL	nL	nL
Marienberg		10526	SI SA	1794	sU	mU	sU	mU	--	--	--	sU
Mendig	EDPN			597	--	--	--	--	--	--	--	mU
Koblenz		10515	SI SA	315	--	--	nL	--	--	--	nL	--
Kleiner Feldberg		10635	SI SA	2640	sU	sU	sU	sU	sU	sU	mU	sU
Frankfurt	EDDF	10637	SI	368	mU	--	--	nL	nL	--	--	--
Finthen	EDOT			760	mU	--	--	nL	nL	--	--	mU
Bad Kreuznach	EDEH			345	mU	--	nL	nL	--	--	--	--
Pferdsfeld	EDSP	10626	SI	1299	sU	mU	--	--	--	mU	mU	mU
Idar Oberstein	EDZB			1233	sU	mU	--	--	--	mU	sU	sU
Baumholder	EDEK			1398	mU	mU	--	--	--	mU	mU	mU
Sembach	EDAS			1052	--	--	mU	mU	mU	--	mU	nL
Ramstein	EDAR			782	--	--	--	--	--	--	--	--
Tholey		10706	SI SA	1305	mU	mU	--	--	--	--	mU	mU
Zweibrucken	EDAM			1133	sU	--	--	--	--	--	nL	--
Saarbrucken	EDRS	10708	SI	1057	--	mU	--	--	--	--	--	--
Berus		10704	SI SA	1191	mU	--	--	--	--	mU	--	mU
Toul	LFSL	07179	SI	935	mU	--	--	--	mU	mU	--	nL
Nancy Essey	LFSN	07180	SI	738	--	--	--	--	--	--	--	--
Nancy Ochey	LFSO	07181	SI	1102	mU	--	--	mU	--	--	--	--

Remarks: Stations with an ICAO identifier listed normally are received routinely. If they must be ARQed, use 'SA." Stations with a WMONO identifier listed report in synoptic code. Many must be ARDed. Use "SI" for 3-hourly data and SN or SA (for Aero data) for hourly data, as indicated in ARQ column.

Elevations are in feet.

Upslope/lee effects are indicated for eight wind directions. This information is taken from the GMGO Upslope and Lee Effect charts. The key:

- mU: moderate upslope effect.
- sU: strong upslope effect.
- nL: normal lee effect.
- --: neither upslope nor lee effect.

SECTION II

CLIMATIC AIDS

2-1

OPERATIONALLY CRITICAL TERMINAL FORECAST ELEMENTS AT BITBURG

1. CIG/VIS

   a. Less than 300/1.0nm -- USAFE CAT I Pilot minima.

   b. Less than 500/1.5nm -- USAFE CAT II Pilot minima.

   c. Less than 800/2.0nm -- USAFE CAT III Pilot minima.

   d. Less than 2000/4.3nm -- FCF minima & IFR conditions.

2. Precipitation

   a. Freezing Precipitation (FZRA/FZDZ) -- PWW criteria.

   b. Hail ½in or greater -- PWW criteria.

   c. Snow, ½in or greater accumulation -- MWA criteria.

3. Surface Winds

   a. 35kts or greater -- PWW criteria.

   b. Cross winds 30Kts or greater (XWND component) -- MWA criteria.

4. Thunderstorms/Lightning -- MWA criteria.

5. Icing, Moderate or greater intensity -- MWA criteria.

<u>Median Weather Conditions and Percent Chance of Operationally Significant Weather</u>

The following monthly tabulations were extracted from the RUSSWO, period of record (POR) 1968-1978, POR for extremes 1952-1979.

Since RUSSWO reports are in statue miles and Bitburg visibility is reported in nautical miles, the CIG/VIS percentages are interpolated.

Since hail and cross winds greater than 30kts are extremely rare, they were not included in the tables.

2-3

EDAB			JANUARY					
	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	015	4.3	34	30	29.97	WSW10	28	41
02-04	012	4.0	34	30	29.97	SW10	30	40
05-07	012	4.0	33	30	29.96	SW10	30	39
08-10	015	2.6	34	30	29.97	WSW10	24	50
11-13	015	4.0	36	31	29.98	SW11	24	45
14-16	018	4.3	36	31	29.96	SW11	23	42
17-19	018	5+	35	30	29.97	SW10	24	38
20-22	018	5+	34	30	29.97	WSW10	25	38

NOTE: Secondary prevailing wind is E 07

	% CHANCE OF OPERATIONALLY					SIG	WEATHER	
TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 10.nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	1.9	–	0.9	10.2	13	24	37	69
02-04	1.4	–	1.0	10.1	15	27	40	75
05-07	1.2	–	0.8	10.1	16	28	43	74
08-10	1.4	–	0.6	7.4	21	34	45	77
11-13	1.6	–	0.4	7.8	15	26	37	74
14-16	1.1	0.1	–	8.1	12	21	32	65
17-19	1.5	–	0.6	8.2	11	20	29	64
20-22	1.4	–	0.4	8.3	11	18	29	64

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	W56	.96"	5.7"	13"	51	-3
POR: 68-78	EXTREMES		52-79			

EDAB FEBRUARY

	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	035	5+	33	28	29.93	E 07	22	36
02-04	020	5+	32	28	29.93	WSW10	25	38
05-07	018	4.3	32	27	29.92	WSW10	27	42
08-10	020	4.0	33	29	29.94	E 08	24	47
11-13	020	5+	36	30	29.95	WSW11	22	40
14-16	030	5+	38	30	29.93	WSW10	19	35
17-19	040	5+	35	29	29.93	WSW10	22	31
20-22	045	5+	34	29	29.92	WSW09	23	29

NOTE: WND NE-E 26% of time, SW-W 28% of time, All Hours.

	% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER							
TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	1.5	-	0.4	9.1	9	15	23	52
02-04	0.8	-	0.1	10.6	13	20	30	60
05-07	-	-	0.2	13.6	14	24	34	66
08-10	0.5	-	0.7	13.1	18	27	37	69
11-13	1.3	-	0.9	11.6	12	19	26	58
14-16	0.9	-	0.7	7.7	8	13	18	47
17-19	0.7	0.2	0.1	7.9	7	13	18	44
20-22	1.2	0.1	0.7	9.7	7	11	17	44

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	W 60	1.18"	8.2"	11"	63	-3

POR: 68-78 EXTREMES 52-79

EDAB MARCH

TIME (Z)	MEDIAN CIG	VIS	CONDITIONS TT	TD	ALSTG	PREV WND	% CHANCE PRECIP	OBST
23-01	070	5+	36	30	29.97	ENE 07	20	27
02-04	045	5+	36	29	29.96	ENE 07	20	32
05-07	035	4.3	35	29	29.96	ENE 07	21	47
08-10	035	4.3	38	31	29.98	E 08	21	46
11-13	035	5+	43	31	29.98	WSW11	15	30
14-16	050	5+	44	31	29.95	WSW11	16	22
17-19	090	5+	41	30	29.95	WSW09	18	23
20-22	100	5+	38	30	29.97	ENE 07	19	19

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	0.4	-	-	7.2	4	8	15	39
02-04	0.1	0.1	-	8.4	7	13	19	47
05-07	0.3	-	-	8.4	11	17	26	57
08-10	1.1	-	-	8.4	8	15	25	62
11-13	1.2	-	-	5.8	2	5	10	40
14-16	1.4	0.1	-	3.9	1	3	6	27
17-19	0.4	0.1	-	4.4	2	5	9	28
20-22	0.6	-	-	6.3	3	5	10	30

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	W 58	1.02"	6.2"	9"	72	7

POR: 68-78 EXTREMES 52-79

EDAB				APRIL				
	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	200	5+	41	33	29.94	WSW09	16	14
02-04	100	5+	40	33	29.93	WSW09	17	21
05-07	080	5+	40	33	29.92	WSW10	16	41
08-10	050	5+	45	35	29.93	WSW11	15	31
11-13	040	5+	49	34	29.93	WSW12	16	14
14-16	045	5+	51	34	29.90	WSW12	18	8
17-19	200	5+	48	34	29.90	WSW10	16	11
20-22	NO	5+	44	34	29.93	WSW09	14	10

	% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER							
TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	-	-	-	4.2	1.3	3	6	21
02-04	0.1	-	-	5.2	2	6	10	30
05-07	0.2	-	-	5.4	5	10	15	44
08-10	0.9	-	-	4.2	3	6	10	38
11-13	1.3	-	-	3.9	0.9	3	5	25
14-16	1.4	0.4	-	3.2	0.5	1.5	4	18
17-19	0.5	0.4	-	2.1	1.1	3	5	17
20-22	0.1	-	-	2.5	1.1	3	4	17

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	33050	.88"	3.8"	4"	82	22

POR: 68-78 EXTREMES 52-79

EDAB MAY

	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	NO	5+	48	41	29.98	ENE 06	11	15
02-04	100	5+	47	41	29.96	ENE 06	13	28
05-07	090	5+	49	42	29.96	E 06	14	42
08-10	030	5+	55	44	29.97	WSW09	9	29
11-13	080	5+	59	43	29.96	WSW10	11	9
14-16	090	5+	60	43	29.95	WSW10	12	6
17-19	200	5+	57	43	29.94	WSW08	12	8
20-22	NO	5+	52	42	29.98	ENE 06	12	9

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	-	0.8	-	-	1.5	3	6	19
02-04	-	0.1	-	-	5	8	22	33
05-07	0.1	0.5	-	0.1	6	12	18	46
08-10	0.3	0.2	-	0.1	1.0	3	6	35
11-13	0.6	0.4	-	-	0.7	1.3	2.5	15
14-16	0.5	1.7	-	-	0.3	0.5	1.7	11
17-19	-	2.3	-	-	0.4	1.1	3	10
20-22	-	1.2	-	-	0.1	0.4	3	13

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	25047	1.17"	1.2"	T	85	28

POR: 68-78 EXTREMES 52-79

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EDAB	JUNE							
	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	NO	5+	54	47	30.03	ENE05	8	15
02-04	NO	5+	52	47	30.02	ENE05	9	34
05-07	120	5+	54	48	30.01	ENE05	9	46
08-10	100	5+	61	49	30.02	WSW09	9	25
11-13	080	5+	64	48	30.02	WSW10	10	11
14-16	090	5+	65	48	30.00	WSW10	12	7
17-19	200	5+	62	48	30.00	WSW08	10	10
20-22	NO	5+	58	48	30/02	NE 05	8	14

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	-	0.7	-	-	0.8	2	5	17
02-04	-	0.4	-	-	3	6	12	32
05-07	-	0.1	-	-	4	9	17	43
08-10	-	-	-	-	0.4	2	5	27
11-13	0.2	1.4	-	-	0.1	0.7	2	12
14-16	0.3	3.0	-	-	-	0.7	1.[illegible]	10
17-19	-	1.6	-	-	-	0.5	0.9	10
20-22	0.1	1.2	-	-	-	0.8	3	11

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP		
EXTREMES	SW50	1.96"	-	-	91	35		
POR: 68-78	EXTREMES 52-79							

2-9

EDAB			JULY					
	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	NO	5+	58	51	30.04	WSW07	6	14
02-04	NO	5+	56	51	30.03	WSW07	7	32
05-07	120	5+	57	51	30.03	WSW07	10	48
08-10	100	5+	64	53	30.04	WSW09	9	26
11-13	070	5+	68	52	30.04	WSW10	8	10
14-16	090	5+	69	52	30.02	W 10	9	4
17-19	200	5+	66	52	30.01	W 08	10	6
20-22	NO	5+	62	52	30.03	WSW07	8	10

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	-	1.2	-	-	0.1	0.8	3	14
02-04	-	0.4	-	-	3	5	10	28
05-07	-	0.2	-	-	4	9	15	42
08-10	0.3	0.1	-	-	0.4	3	7	28
11-13	0.3	0.8	-	-	-	0.5	1.5	11
14-16	0.3	2.1	-	-	-	1.1	1.4	7
17-19	0.3	2.4	-	-	-	0.3	0.8	5
20-22	-	1.3	-	-	-	0.1	0.8	7

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	SSE54	3.29"	-	-	96	40

POR: 68-78 EXTREMES 52-79

EDAB AUGUST

	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	NO	5+	56	52	30.06	ENE05	8	17
02-04	NO	5+	56	51	30.05	ENE05	7	31
05-07	200	5+	56	52	30.05	ENE05	8	50
08-10	200	5+	63	53	30.07	E 06	7	34
11-13	120	5+	68	52	30.06	WSW10	6	13
14-16	100	5+	69	52	30.04	WSW10	7	8
17-19	200	5+	66	52	30.03	WSW08	8	12
20-22	NO	5+	61	52	30.06	ENE04	8	13

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	-	1.2	-	-	1.4	3	7	16
02-04	-	1.1	-	-	3	6	10	28
05-07	-	0.4	-	-	5	10	18	47
08-10	-	0.1	-	-	1.0	3	7	33
11-13	-	0.8	-	-	-	0.3	1.2	13
14-16	-	2.2	-	-	-	0.1	1.2	7
17-19	0.1	2.9	-	-	0.1	0.5	2	9
20-22	-	1.9	-	-	0.4	1.1	2	10

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	25046	2.56"	-	-	88	39

POR: 68-78, EXTREMES 52-79

2-11

EDAB SEPTEMBER

	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	NO	5+	52	47	30.07	WSW09	7	28
02-04	NO	5+	51	47	30.06	WSW08	9	41
05-07	090	4.0	50	47	30.06	WSW09	9	60
08-10	080	5+	56	49	30.08	WSW10	11	48
11-13	080	5+	61	49	30.08	WSW10	9	21
14-16	090	5+	62	49	30.06	WSW10	10	9
17-19	200	5+	58	48	30.05	WSW08	8	14
20-22	NO	5+	54	48	30.07	WSW09	7	17

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	0.3	0.6	-	-	3	6	12	27
02-04	0.3	0.1	-	-	8	13	20	41
05-07	0.3	0.1	-	-	14	22	30	61
08-10	0.1	-	-	-	6	12	20	53
11-13	0.7	0.1	-	-	0.4	2	5	24
14-16	0.6	0.7	-	-	-	0.8	1.6	13
17-19	0.6	0.8	-	-	0.1	0.9	2	14
20-22	0.4	0.3	-	-	0.9	2	5	18

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	WNW45	1.56"	T	-	86	34
POR: 68-78	EXTREMES	52-79				

GENERAL PURPOSE

EDAB — OCTOBER

	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	080	5+	45	41	30.07	WSW09	13	38
02-04	040	5+	44	41	30.06	WSW09	15	43
05-07	030	4.0	43	40	30.04	WSW09	14	54
08-10	025	4.3	47	42	30.07	WSW09	12	53
11-13	035	5+	52	43	30.07	WSW09	12	36
14-16	080	5-	53	43	30.05	WSW09	11	27
17-19	120	5+	49	42	30.06	WSW08	12	28
20-22	200	5+	46	42	30.07	E 05	12	29

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	0.2	0.2	-	0.1	10	17	23	49
02-04	0.3	0.3	-	0.2	18	25	33	59
05-07	0.1	-	0.1	0.6	24	32	42	68
08-10	0.2	-	0.1	0.1	17	27	37	66
11-13	1.2	0.1	-	0.1	5	9	15	45
14-16	0.3	0.1	-	0.1	2	4	7	30
17-19	0.1	0.2	-	0.1	2	5	8	31
20-22	0.1	0.2	-	0.1	4	7	14	36

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	SW 48	1.36"	0.3"	-	75	26

POR: 68-78 EXTREMES 52-79

EDAB			NOVEMBER					
	MEDIAN		CONDITONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	020	5+	39	35	30.02	WSW11	24	30
02-04	018	5+	38	35	30.01	WSW10	26	33
05-07	015	5+	38	35	30.00	WSW10	29	35
08-10	015	4.3	39	36	30.02	WSW11	23	42
11-13	018	5+	42	36	30.02	WSW11	22	33
14-16	025	5+	42	37	30.00	WSW10	22	26
17-19	030	5+	40	36	30.01	WSW10	21	26
20-22	025	5+	39	36	30.01	WSW11	22	24

% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER

TIME (Z)	WND 22K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	2.0	-	0.3	4.9	14	20	27	57
02-04	2.0	-	0.7	4.8	17	24	33	64
05-07	2.8	-	0.6	5.1	19	29	40	70
08-10	2.5	-	0.2	4.4	19	28	38	71
11-13	1.4	-	0.1	4.6	12	18	25	61
14-16	1.0	-	-	3.8	10	15	20	48
17-19	1.9	0.2	-	4.9	10	14	20	47
20-22	2.1	-	0.2	5.0	11	15	23	50

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	250 55	2.10"	5.0"	4"	65	15

POR: 68-78 EXTREMES 52-79

2-14

EDAB	DECEMBER							
	MEDIAN		CONDITIONS				% CHANCE	
TIME (Z)	CIG	VIS	TT	TD	ALSTG	PREV WND	PRECIP	OBST
23-01	015	4.3	33	29	30.08	WSW10	23	39
02-04	012	4.0	33	29	30.08	WSW10	21	42
05-07	012	4.0	32	29	30.07	WSW10	23	44
08-10	015	2.6	33	29	30.09	WSW10	23	52
11-13	015	4.0	35	30	30.10	WSW10	21	46
14-16	020	4.3	35	30	30.08	WSW10	20	44
17-19	020	5+	34	29	30.09	WSW10	22	36
20-22	015	5+	33	29	30.10	WSW10	24	36

NOTE: Secondary prevailing wind is E 07

	% CHANCE OF OPERATIONALLY SIGNIFICANT WEATHER							
TIME (Z)	WND 32K (G37)	TSTM	FZRA FZDZ	SN	300/ 1.0nm	500/ 1.5nm	800/ 2.0nm	2000/ 4.3nm
23-01	1.0	-	1.3	7.6	19	30	42	68
02-04	1.4	-	1.2	7.1	21	32	41	69
05-07	1.4	-	1.6	10.9	21	31	42	71
08-10	0.8	-	.4	8.6	22	33	43	72
11-13	0.7	-	.1	8.6	17	27	38	69
14-16	1.0	-	.6	7.4	17	27	34	65
17-19	0.6	-	1.3	7.8	17	24	33	61
20-22	0.9	-	1.6	8.4	19	27	37	64

	PK WND	24HR PRECIP	24HR SNOW	SNOW DEPTH	MAX TEMP	MIN TEMP
EXTREMES	25056	1.29"	8.0"	6"	58	4

POR: 68-78, EXTREMES 52-79

SECTION III

RULE OF THUMBS (ROT)

(BITBURG HAS NO APPROVED LOCAL FORECAST STUDY)

3-1

RULE OF THUMB (RAIN vs SNOW)

When precipitation occurs at Bitburg AB during the months November thru April, the following probabilities apply.

1000-700MB ST Hubert thickness in meters	Types of Precipitation During next 12 hours	Probability (per cent change of occurrence)
2860	Rain	100
2830	Rain	97
2820	Rain	91
2810	Rain	74
2820	Snow	75
2810	Snow	88
2800	Snow	94
2790	Snow	96
2770	Snow	100

Equal probability of rain or snow when thickness = 2815

Observation

Time of RAOB __________

1000-700mb thickness __________

Type of precipitation during subsequent 12 hour period __________

Verification using independent data 1971 - 1976

		Forecast		
		SNOW	RAIN	TOTAL
OBSERVED	SNOW	64	19	83
	RAIN	11	194	205
	TOTAL	75	213	288

89.7 percent correct

Rules of Thumb -- Fog Dissipation

Use between 1 Jul and 30 Nov, normally when visibility near sunrise is less than 1.0nm in fog.

Rule 1 (Approved). Between 1 Jul and 15 Oct visibility will almost always improve to 1.0nm by the time indicated by the line labled "latest" on the graph. (21 of 21 cases with independent data). After 15 Oct visibility may stay below 1.0nm all day.

Rule 2 (Approved). More than half the time visibility will improve to 1.0nm within one hour of the time indicated by the line labled VIS 0.0-0.1, VIS 0.15-0.4, or VIS 0.5-0.9. Determine EDAB 0530Z visibility and select the appropriate line on the graph. (17 of 23 cases with independent data; however, verification was lower with dependent data). After 30 Oct, for visibility 0.0-0.1nm, rule does not apply because visibility stays below 1.0nm all day about half the time.

Rule 3 (Approved). In November, when the three following conditions are satisfied, visibility will remain below 1.0nm all day. If the three conditions are not met, visibility will improve to 1.0nm before 1300Z. (2 of 2 cases, and 4 of 6 cases with independent data).

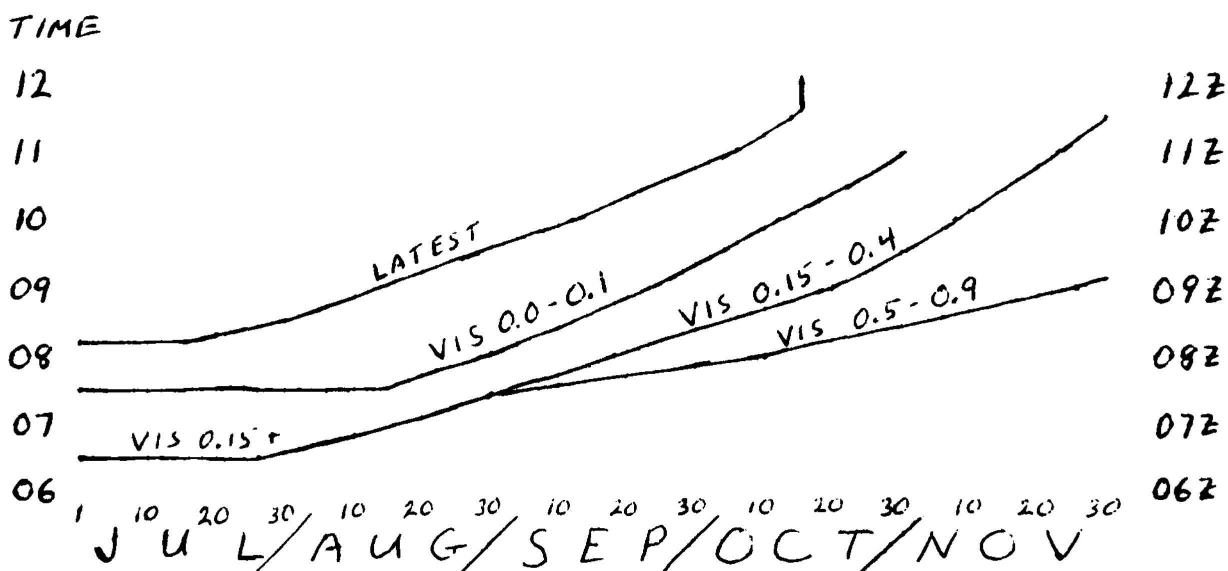
a. Minimum visibility within one hour of sunrise 0.0-0.1nm.

b. Sometime within two hours of sunrise ceiling of 000-001 is reported or freezing fog is reported.

c. Surface wind does not exceed three knots within one hour of sunrise.

Rule 4 (Test). In November, if the EDAB 0500Z visibility is less than 0.5nm in fog and surface wind speed is 1-3 knots, visibility will remain below 1.0nm all day. (6 of 8 cases).

Rule 5 (Test). In November, on foggy mornings, if visibility doesn't improve to 1.0nm by 1300Z, it won't, (14 of 18 cases).



Rules of Thumb -- Fog formation

Use at 0500Z in Oct, Nov, and Dec.

Rule 1 (Approved). If fog is not reported at 05Z at EDAB, visibility will not decrease below 1.0nm in fog before 11Z. (77 of 79 cases with independent data).

Rule 2 (Approved). If the 05Z EDAB surface wind falls in area C of figure one, visibility will not decrease below 1.0nm in fog before 11Z. (61 of 62 cases with independent data).

Rule 3 (Test). If fog is reported at 05Z at EDAB (including fog with precipitation) and the 05Z EDAB surface winds fall in area A of figure one, visibility will decrease below 1.0nm in fog (or fog and precipitation) before 11Z. (26 of 32 cases with dependent data).

Rule 4 (Test). If the following conditions are satisfied, visibility will decrease below 1.0nm in fog (or fog and precipitation) before 11Z.

a. Fog reported at 05Z at EDAB (including fog with precipitation).

b. The 05Z EDAB surface winds falls in area A or B of figure one, and

c. The 02Z to 05Z EDAB visibility trend falls in area labled "YES" in figure two, or the 04Z to 05Z EDAB visibility trend falls in area labled "YES" in figure three.

(Dependent data suggests 80% accuracy, 6 of 10 cases correct with independent data).

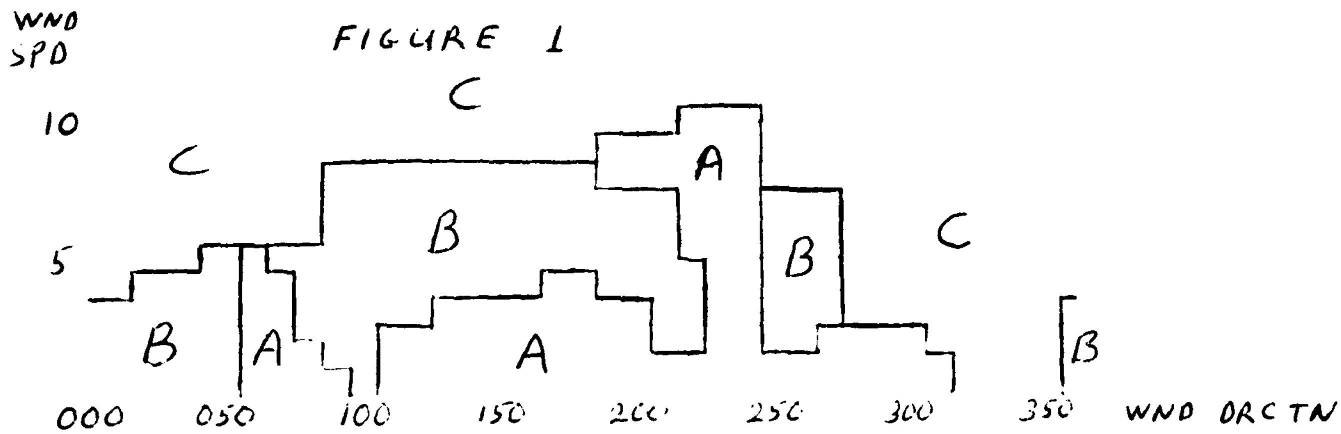
Rule 5 (Test). If all three conditions in rule 4 are not satisfied, visibility will not decrease below 1.0nm in fog before 11Z. (12 of 18 cases correct with independent data).

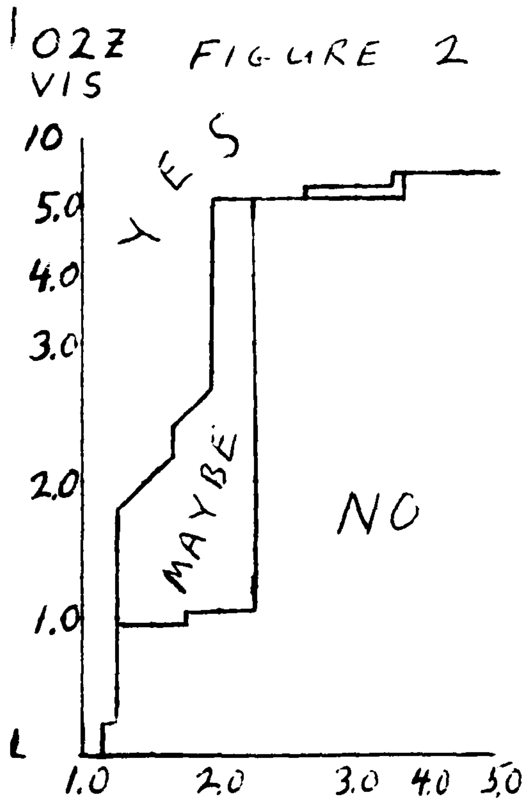
Rule 6 (Test). If visibility does decrease to less than 1.0nm in fog (or fog and precipitation) between 05Z and 11Z it will decrease within one hour of time indicated by the line or figure four. (32 of 45 cases with dependent data, 25 of 45 cases are correct within 30 minutes).

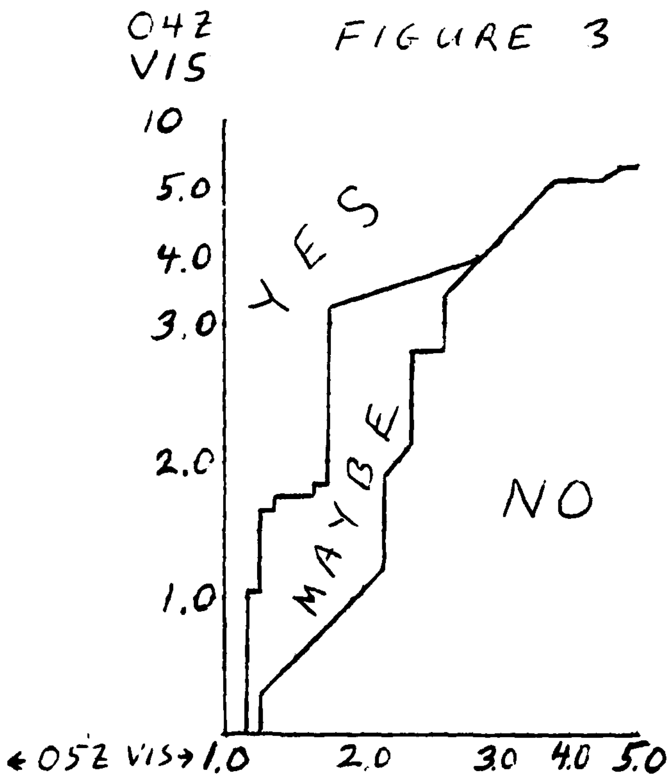
Rule 7 (Test). If visibility does decrease to less than 1.0nm in fog (or fog and precipitation), between 05Z and 11Z it will decrease between 05Z and 06Z in October (9 of 17 cases), between 06Z and 07Z in November (7 of 16 cases), and between 07Z and 08Z in December (6 of 12 cases). (All cases are dependent data).

Rules of Thumb -- Fog formation, Oct Dec

Figures for use with Rules [illegible] - 5.





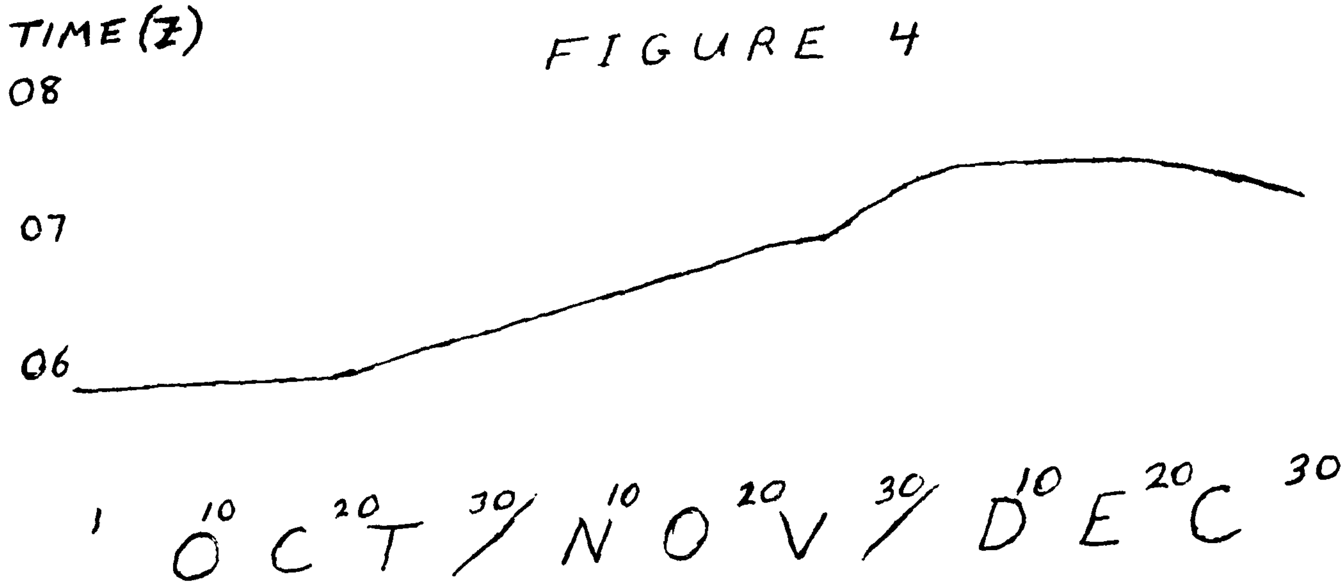


3-5

Rules of Thumb -- Fog formation, Oct-Dec

Figure for use with Rule 6.

FIGURE 4



SECTION IV

WEATHER CONTROL

This section discusses some operationally significant weather (fog, freezing precipitation, snow, and thunderstorms) and presents some seasonal synoptic patterns.

FOG

Fog is the most frequent weather problem at Bitburg. Fog occurrence has a marked diurnal and seasonal variation. See figure 1. Spring and Summer fogs lift rapidly while fall and winter fogs are slow to lift and sometimes persist all day (or for several days). See figure 2.

The Catalogue of European Large Scale Weather Types (Baur Catalogue) identifies five weather types with which cold season fog is typical. They are Well Defined Closed High Over Central Europe (HM), Anticyclonic Southwesterly, Southerly, and Southeasterly flow (SWA, SA, and SEA), and Cyclonic Southerly Flow (SZ). Morning fogs are specified with southeasterly flow; the other weather types make no diurnal distinction.

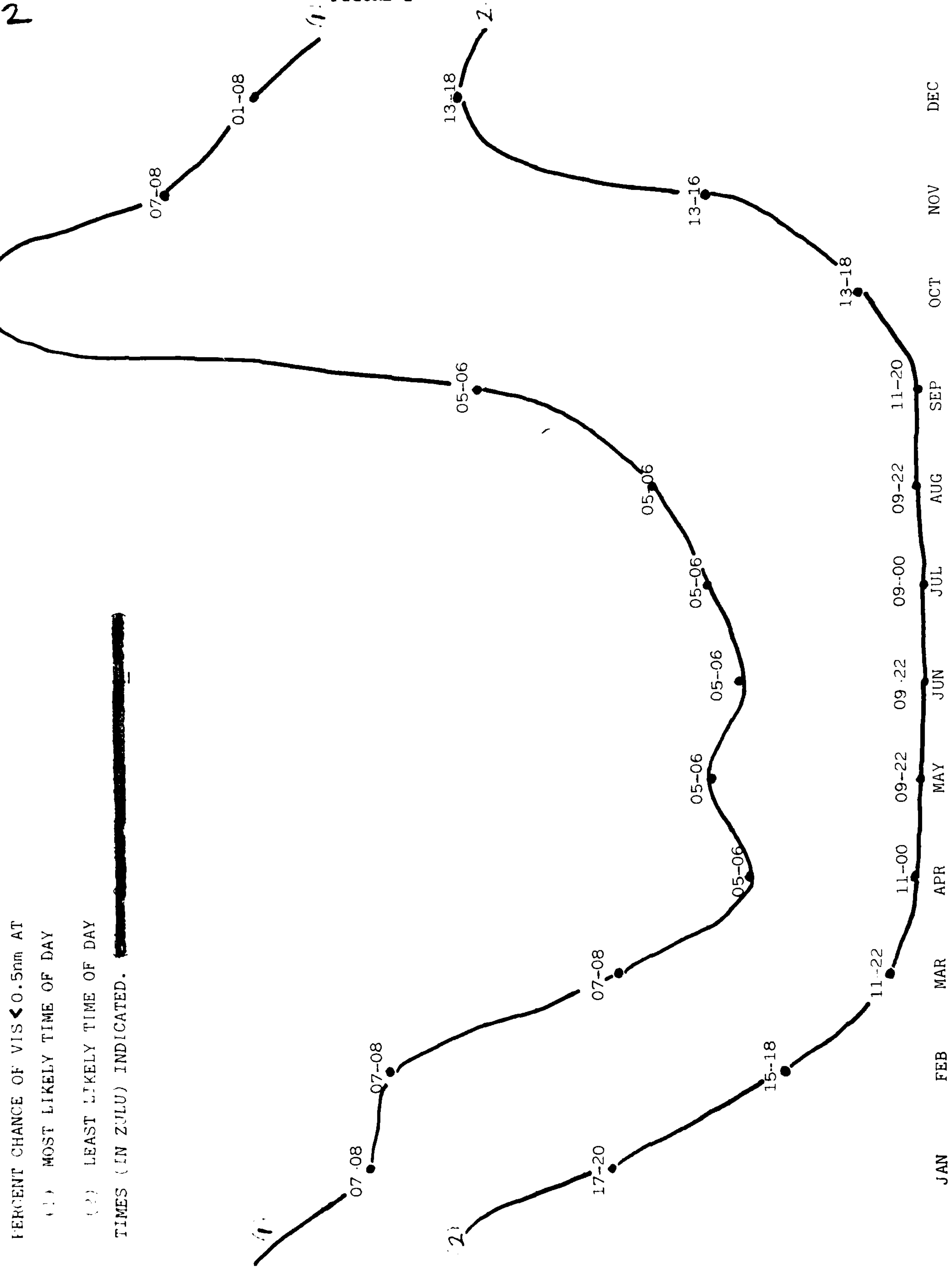
Fog forecasting challenges for normal 36 TFW flying are (1) the time visibility will improve to 1.0NM, and (2) from September thru March, if visibility will drop below 1.0NM after 05Z.

The time fog reduced visibility improves to 1.0nm has a marked seasonal variation. Figure 2 illustrates the median time visibility becomes 1.0nm when fog reduced visibility near sunrise is less than 0.5nm. Fog density has a strong impact on the time fog will break. Figure 3 uses the prevailing visibility near sunrise as an indication of fog density and illustrate the impact of fog density (visibility) on time visibility improves to 1.0nm in late summer and fall. Surface winds have a complex effect on fog break time, the specific effect appears to vary by season or even by month. Consult the Conditional Climatology tables for specifics.

The likelyhood of visibility dropping below 1.0nm in fog after 05Z appears to be a function of surface wind, type of obstruction to visibility, specific visibility, and visibility trend. Calm/very light winds, or light winds from 060 through 240 degrees, are conducive to fog formation.

4-2

FIGURE 1


PERCENT CHANCE OF VIS < 0.5nm AT
(1) MOST LIKELY TIME OF DAY
(2) LEAST LIKELY TIME OF DAY
TIMES (IN ZULU) INDICATED. [redacted]
18
16
14
12
10
8
6
4
2
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
(1)
07-08
07-08
07-08
05-06
05-06
05-06
05-06
05-06
05-06
07-08
07-08
01-08
(1)
(2)
17-20
15-18
11-22
11-00
09-22
09-22
09-00
09-22
11-20
13-18
13-16
13-18
(2)

4-3

MEDIAN TIME VISIBILITY BECOMES 1.0nm WHEN VIS NEAR SUNRISE <0.5nm

VIS 0.5nm

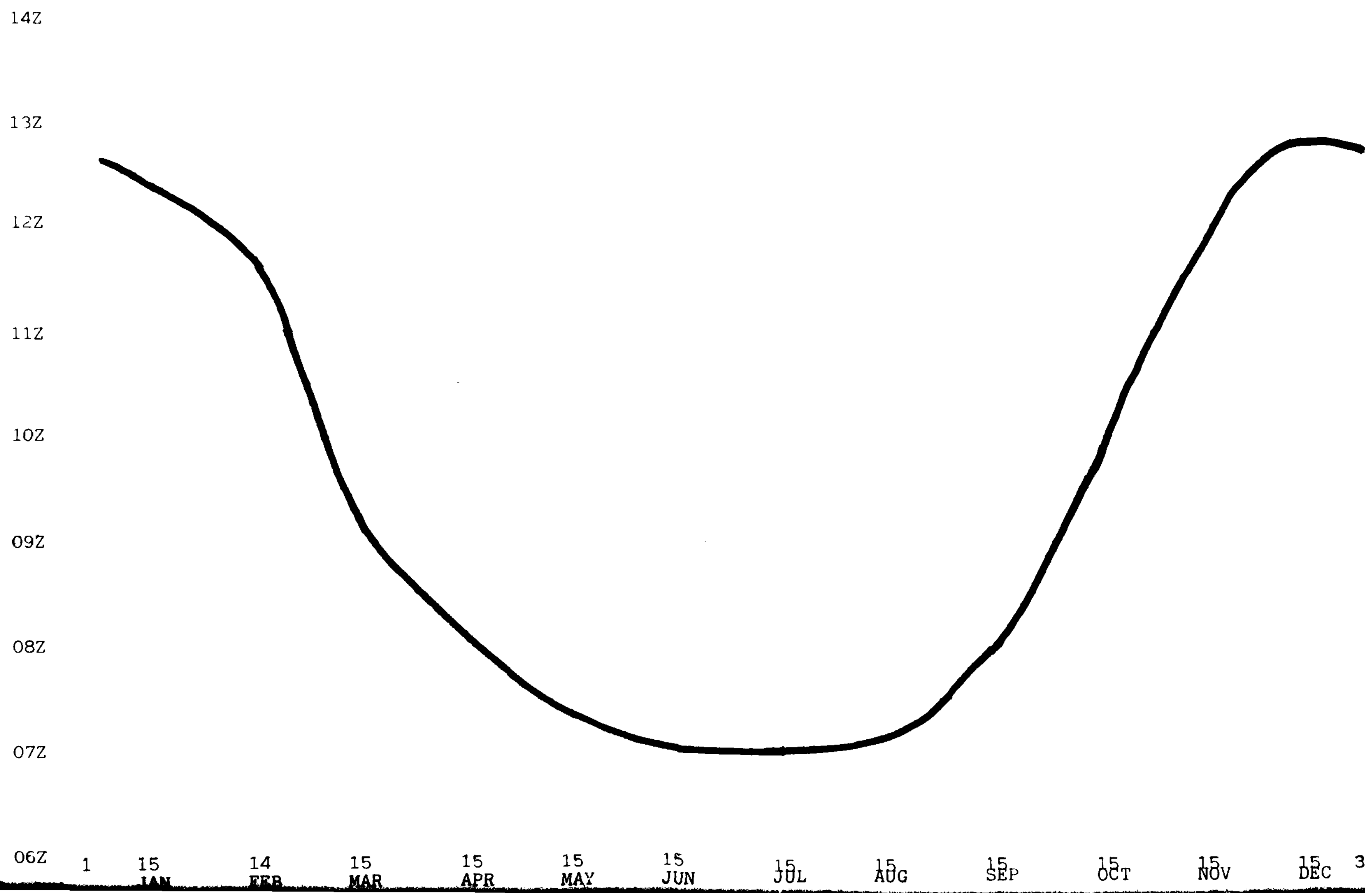


FIGURE 2

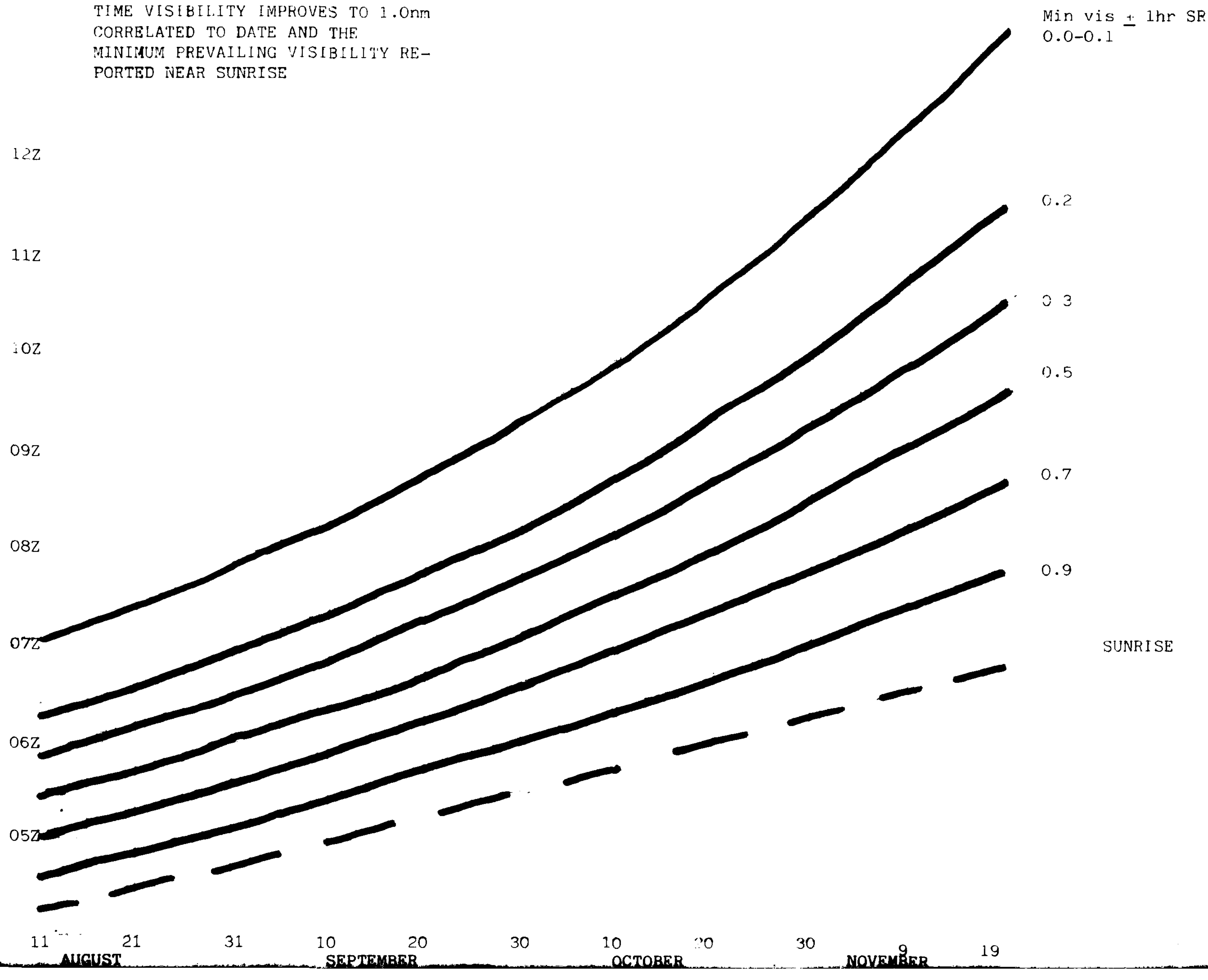

TIME VISIBILITY IMPROVES TO 1.0nm CORRELATED TO DATE AND THE MINIMUM PREVAILING VISIBILITY REPORTED NEAR SUNRISE
Min vis ± 1hr SR
0.0-0.1
0.2
0.3
0.5
0.7
0.9
SUNRISE
12Z
11Z
10Z
09Z
08Z
07Z
06Z
05Z
11
21
31
10
20
30
10
20
30
9
19
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER

FIGURE 3

FREEZING PRECIPITATION

Freezing precipitation is supercooled water drops that freeze on impact with solid objects and produce a layer of clear ice. It occurs when rain/drizzle falls on ground that is at or below freezing. Climatology indicates freezing precipitation occurs at Bitburg seven days a year from late October until the end of February. Its occurrence varies diurnally with the temperature. In the five winters, 1975-1980, it occurred on 19 days, the earliest on 24 Nov, the latest 21 Feb. Favorable conditions for freezing precipitation at Bitburg include:

-- 1000-700mb thickness 2810 meters or greater.

-- An inversion aloft (normally a frontal inversion).

-- A layer of above freezing air above the inversion greater than 500 feet thick.

-- A layer of below freezing air next to the surface less than 1000 feet thick. A layer greater than 1000 feet thick should cause ice pellets.

-- Surface temperatures at or below freezing.

A study of 21 cases of freezing precipitation (1974-1980) revealed the following about Bitburg weather conditions one-two hours before freezing precipitation began.

-- In all cases surface temperatures were $0^{o}C$ to $-5^{o}C$.

-- In all cases a ceiling was reported; 12 cases (57%) had ceilings below 800 feet.

-- In 20 cases (95%) surface wind direction was between 060^{o} and 260^{o}; 14 cases (67%) had winds between 060^{o} and 120^{o}. In the 7 cases with winds between 190^{o} and 260^{o} or calm the ceiling was less than 800 feet and freezing drizzle (not freezing rain) was subsequently reported.

-- In 2 cases (10%) drizzle turned to freezing drizzle, in 2 cases (10%) snow turned to freezing precipitation, and in 1 case (5%) ice pellets turned to freezing rain. In the other cases (76%) precipitation began as, or quickly changed to, freezing precipitation.

-- Freezing rain is associated with easterly surface winds and is much more likely to cause hazardous ice conditions than freezing drizzle is likely to cause.

Synoptic situations associated with freezing precipitation at Bitburg are not documented except for two bust reviews which describe freezing precipitation associated with a front moving through France towards Bitburg. In another case freezing precipitation north of Bitburg associated with a southward moving front did not hit Bitburg but did hit south of Bitburg.

Attached is the climatological percentage chance for freezing precipitation by month and three hour time block.

4-6

FREEZING PRECIPITATION

	23-01	02-04	05-07	08-10	11-13	14-16	17-19	20-22
JULY	-	-	-	-	-	-	-	-
AUGUST	-	-	-	-	-	-	-	-
SEPTEMBER	-	-	-	-	-	-	-	-
OCTOBER	-	-	0.1	0.1	-	-	-	-
NOVEMBER	0.3	0.7	0.6	0.2	0.1	-	-	0.2
DECEMBER	1.3	1.2	1.6	0.4	0.1	0.6	1.3	1.6
JANUARY	0.9	1.0	0.8	0.6	0.4	-	0.6	0.4
FEBRUARY	0.4	0.1	0.2	0.7	0.9	0.7	0.1	0.7
MARCH	-	-	-	-	-	-	-	-
APRIL	-	-	-	-	-	-	-	-
MAY	-	-	-	-	-	-	-	-
JUNE	-	-	-	-	-	-	-	-

SNOW

Snow occurs at Bitburg on average of, 59 days a year, an average of 29 days have a measurable amount. Snow may occur anytime from September through June, but normally occurs November through April. December through February or March are the big snow months. The occurrence of snow shows a small diurnal variation paralleling the diurnal temperature variation.

A local rule of thumb uses the 1000-700mb thickness at St. Hubert (06496) as a predictor of type of precipitation during the subsequent 12 hour period. Thickness of 2810-2820gpm indicates mixed rain and snow and thickness of 2800 or less indicates snow.

A German forecasting technique, adapted to Bitburg, uses predictors listed below in an equation to determine the probability that precipitation, if it occurs, will be snow. The predictors, listed by priority of importance in the equation, and the equal probability of rain or snow value for each predictor, are as follows:

(1) Height of the $0^{\circ}C$ limit of the wet bulb temperature above ground -- 135 meters

(2) 1000 - 700MB thickness -- 2820 gpm

(3) 1000 - 850MB thickness -- 1302 gpm

(4) Potential temperature of the boundary layer 50mb above ground -- $+6^{\circ}C$

(5) Surface temperature -- $+0.5^{\circ}C$

(6) 850mb temperature -- $-3.7^{\circ}C$

(7) 1000-500mb thickness -- 5325gpm

(8) 700mb temperature -- $-12^{\circ}C$

(9) 500mb temperature -- $-26^{\circ}C$

More information on this technique is in 2WW/DN Ltr, 5 Nov 79, Objective Snow Forecasting Technique, which is in the Forecaster Aids book.

The Catalogue of European Large Scale Weather Types (Baur Catalogue) identifies four weather types that cause frequent, often abundant, snow in Germany. They are:

(1) Well-Defined Closed High Over Norwegian Sea and Fennoscandia with Cyclonic Flow in Central Europe (HNFZ) there may also be an upper low over central or south central Europe.

(2) Northwesterly Sloped Trough (WW). There is a blocking high over western Russia. The bad weather areas become stationary and are associated with a north-south frontal zone on the western side of the high.

(3) Northeasterly flow (NE). There is an upper low over central Europe. Clouds and snow are most abundant in southeast Germany.

(4) Well-Defined Closed Low over Central Europe (TM). The low is surrounded on almost all sides by high pressure. The heavy precipitation may fall as rain or snow.

Other weather types are also associated with snow in Germany. They include:

(1) Well-Defined Closed High Over Norwegian Sea and Fennoscandia with Anticyclonic flow in Central Europe (HNFA), (2) Well-Defined Closed High over Fennoscandia (HFZ) or over Norwegian Sea (HNZ), both with cyclonic flow over central Europe, (3) Trough Over Central Europe (TRM), (4) Cyclonic Northwesterly (NWZ) or Northerly (NZ) flow, and (5) Anticyclonic Westerly (WA) or Northwesterly (NWA) flow.

The European Theater Weather Orientation pamphlet (2WWP 105-12) describes three synoptic situations that may produce snow.

(1) Slow Moving Low over the North Sea. Troughs move around low. (avg trof movement west to east at 20K). Cold pockets associated with the troughs (and identifiable at 850mb) produce snow.

(2) Deep Low in the Ligurian Sea. Fronts or troughs move around the low spreading snow northward, usually to about 50°N.

(3) Stationary Siberian High. A cold (Arctic) front often forms over eastern Germany and move southwestward bringing snow.

Following is the climatological percentage chance for snow by month and three hour time block.

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SNOW	23-01	02-02	05-07	08-10	11-13	14-16	17-19	20-22
JULY	-	-	-	-	-	-	-	-
AUGUST	-	-	-	-	-	-	-	-
SEPTEMBER	-	-	-	-	-	-	-	-
OCTOBER	0.1	0.2	0.6	0.1	0.1	0.1	0.1	0.1
NOVEMBER	4.9	4.8	5.1	4.4	4.6	3.8	4.9	5.0
DECEMBER	7.6	7.1	10.9	8.6	8.6	7.4	7.8	8.4
JANUARY	10.2	10.1	10.1	7.4	7.8	8.1	8.2	8.3
FEBRUARY	9.1	10.6	13.6	13.1	11.6	7.7	7.9	9.7
MARCH	7.2	8.4	8.4	8.4	5.8	3.9	4.4	6.3
APRIL	4.2	5.2	5.4	4.2	3.9	3.2	2.1	2.5
MAY	-	-	0.1	0.1	-	-	-	-
JUNE	-	-	-	-	-	-	-	-

THUNDERSTORMS

Thunderstorms hit Bitburg about 20 days a year, mostly in May - August. Lightning is the primary hazard; other possible hazards are downrush gusts and ice pellets (small hail). Hail and tornadoes are extremely rare but a tornado did hit Speicher on 18 June 1966 (See 2WW TN 78-3). Thunderstorm occurrence shows a marked diurnal variation, most occur 14-20Z, very few occur 05-10Z. A trigger in addition to diurnal heating is normally required. Watch for high level (500mb) cold advection, mid level (700mb) dry advection, and low level (850mb) warm moist advection; troughs; and fronts (especially warm fronts).

The Catalogue of European Large Scale Weather Types (Baur Catalogue) identifies 14 weather types with which thunderstorms occur. These types can be placed in five groups:

(1) Westerly flow (types WA and WZ).

(2) Low or trough (normally extending north-south) over British Isles (types TB and TRW).

(3) High or ridge (bridge) over central Europe (types BM and HM).

(4) High over Norwegian Sea/Fennoscandanava (types HNZ, HFA, HFZ, and HNFZ).

(5) Miscellaneous: Low over central Europe (TM), S and SE cyclonic flow (SZ and SEZ), and NE flow (NE).

Two other types should be mentioned.

(1) Bauer states NW cyclonic flow (NWZ) produces frequent rain-showers, and sources other than Bauer identify it as a thunderstorm producer.

(2) SW flow, not identified by Bauer as a thunderstorm producer, would frequently be associated with a low/trough over the British Isles which are thunderstorm producers.

Total - totals and Showalter are the most popular thunderstorm indices. Thresholds of 50 and +2 are suggested. Isolated thunderstorms may occur with $\geq$ 46 and $\leq$ +3.

A GMGO paper states that two major factors responsible for the intensity of precipitation from showers and thunderstorms are:

(1) Vertical extension of the TCU/CB above the freezing level.

(2) Temperature on top of the cloud. Figure 1 relates these factors to intensity of shower/thunderstorm, visibility and hail size. These relations have not yet been verified.

Figure 2 presents the climatological percentage chance for thunderstorms by month and three hour time block.

INTENSITY OF TS/RASH

CLOUD TOP TEMP (°C)	VERTICAL EXTENSION OF CLOUD ABOVE FREEZING LEVEL (FEET)	INTENSITY	VIS (IN SHOWER)	HAIL SIZE
-10 to -15	5000 to 7000	80 RASA	4.3NM	______
-15 to -20	7001 to 9000	81 XXSH	3.0NM	______
-21 to -25	9001 to 12,000	82 XXSH	2.5NM	______
-26 to -35	12,001 to 17,000	95 TS	2.0NM	______
-36 to -45	17,001 to 22,000	95 TS	1.5NM	______
-46 to -55	22,000 to 27,000	99 XXTSGR	1.0NM	1/2"-3/4"
-56	27,001 plus	99 XXTSGR	0.5NM	1" - 2"

Figure 1

THUNDERSTORMS

	23-01	02-04	05-07	08-10	11-13	14-16	17-19	20-22
JANUARY	-	-	-	-	-	0.1	-	-
FEBRUARY	-	-	-	-	-	-	0.2	0.1
MARCH	-	0.1	-	-	-	0.1	0.1	-
APRIL	-	-	-	-	-	0.4	0.4	-
MAY	0.8	0.1	0.5	0.2	0.4	1.7	2.3	1.2
JUNE	0.7	0.4	0.1	-	1.4	3.0	1.6	1.2
JULY	1.2	0.4	0.2	0.1	0.8	2.1	2.4	1.3
AUGUST	1.2	1.1	0.4	0.1	0.8	2.2	2.9	1.9
SEPTEMBER	0.6	0.1	0.1	-	0.1	0.7	0.8	0.3
OCTOBER	0.2	0.3	-	-	0.1	0.1	0.2	0.2
NOVEMBER	-	-	-	-	-	-	0.2	-
DECEMBER	-	-	-	-	-	-	-	-

4-13

SKETCHES AND DISCUSSIONS

OF

TYPICAL SEASONAL

SYNOPTIC PATTERNS

SLOW MOVING LOW OVER THE NORTH SEA (FIG. 1)

Low centers located over the North Sea move slowly northeastward. This situation produces a series of troughs, approximately 4-6 hours apart. The troughs move at 15-25 knots from west to east across Germany, producing scattered rain showers and triggering off thunderstorms mostly north of Bitburg. When the low center moves between northern Denmark and southern Norway, cool air is advected from the North Sea into northern Benelux and Germany. It reaches the Bitburg area usually within 24 hours. This cool air-mass at low levels, plus the orographic lifting, creates low ceilings (300 to 1200 ft) with tops between 6-8000ft. Freezing level lowers to 3-4000 ft and produces rain for 24-48 hours depending on the amount and continuation of the advection. As the low moves further eastward, the advection ceases and the cold pocket begins to dissipate under the influence of the westerly flow. These cold pockets are easily located on the 350 MB charts. During the winter months, this situation brings cold moist air and moderate snowfall, 1-3 inches in 24 hours.

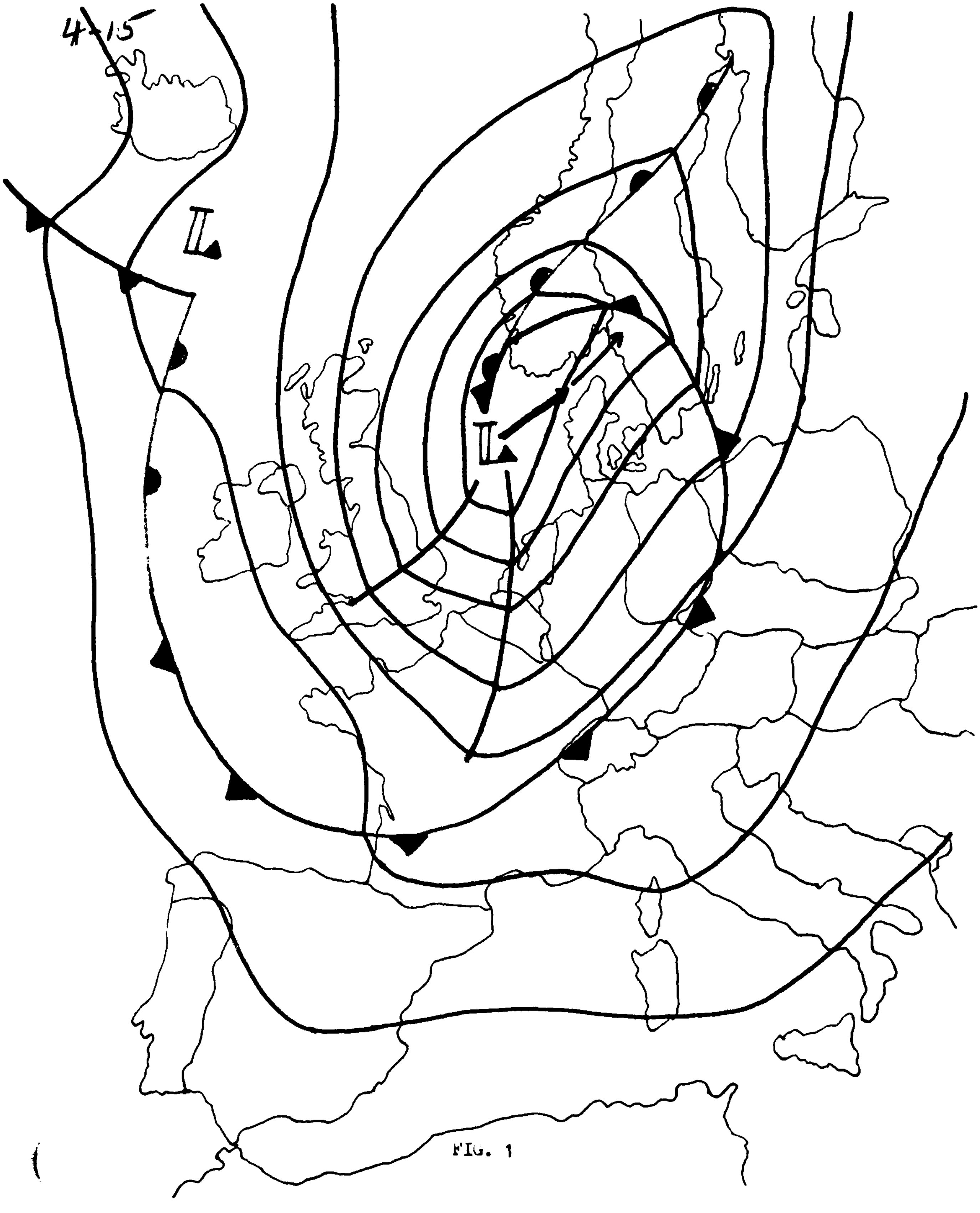

FIG. 1

DEEP LOW IN LIGURIAN SEA (FIG. 2)

When a closed low in the Ligurian Sea stagnates up to 300 MB's, it remains stationary for several days. It usually begins to move across northern Italy into the Gulf of Venecia and continues across northern Yugoslavia and Austria, but may come into southern Germany and even as far north as Ramstein. During this voyage, moisture is constantly transported northward on the eastern side of the low and warm fronts or troughs are created. These troughs move northwestward extending a continuous rain pattern from southern Germany as far north as Frankfurt - Bitburg area. The ridge over northern Europe increases the generally easterly flow over central Germany and moves the troughs and rain pattern at speeds from 5-15 knots. A period of 24 to 48 hours elapses before the low ceilings (700-1500 ft) and rain reaches the Bitburg area. Sometimes when the low center is in the vicinity of Ramstein thunderstorms may occur. Strong winds usually do not occur with this type of thunderstorm. Over southern Germany lows normally recurve, fill and move northeastward. During the winter such situations produce the greatest snowfalls in Germany.

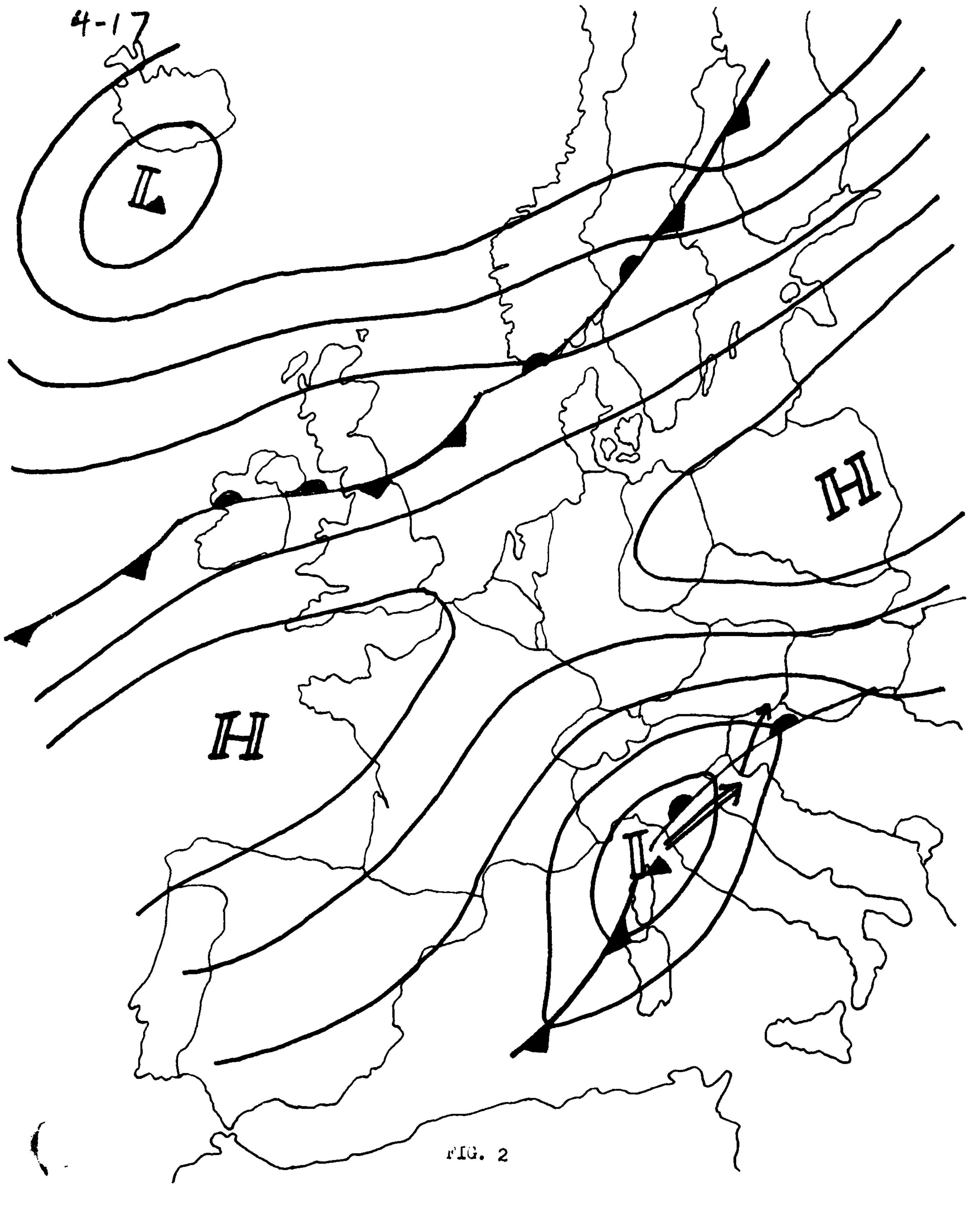

FIG. 2

WAVE ON POLAR FRONT IN BAY OF BISCAY (FIG. 3)

In the summer a wave (often weak) on the polar front located in the Bay of Biscay may enter western France and then curve northeastward across France, pass over the Bitburg area, and continue toward Berlin. This synoptic situation brings precipitation into the Bitburg area well in advance (12-18 hours) of the approaching low. Ceilings can be expected as low as 2-500 feet. During the winter this low usually continues its movement across southwestern France into the Ligurian Sea.

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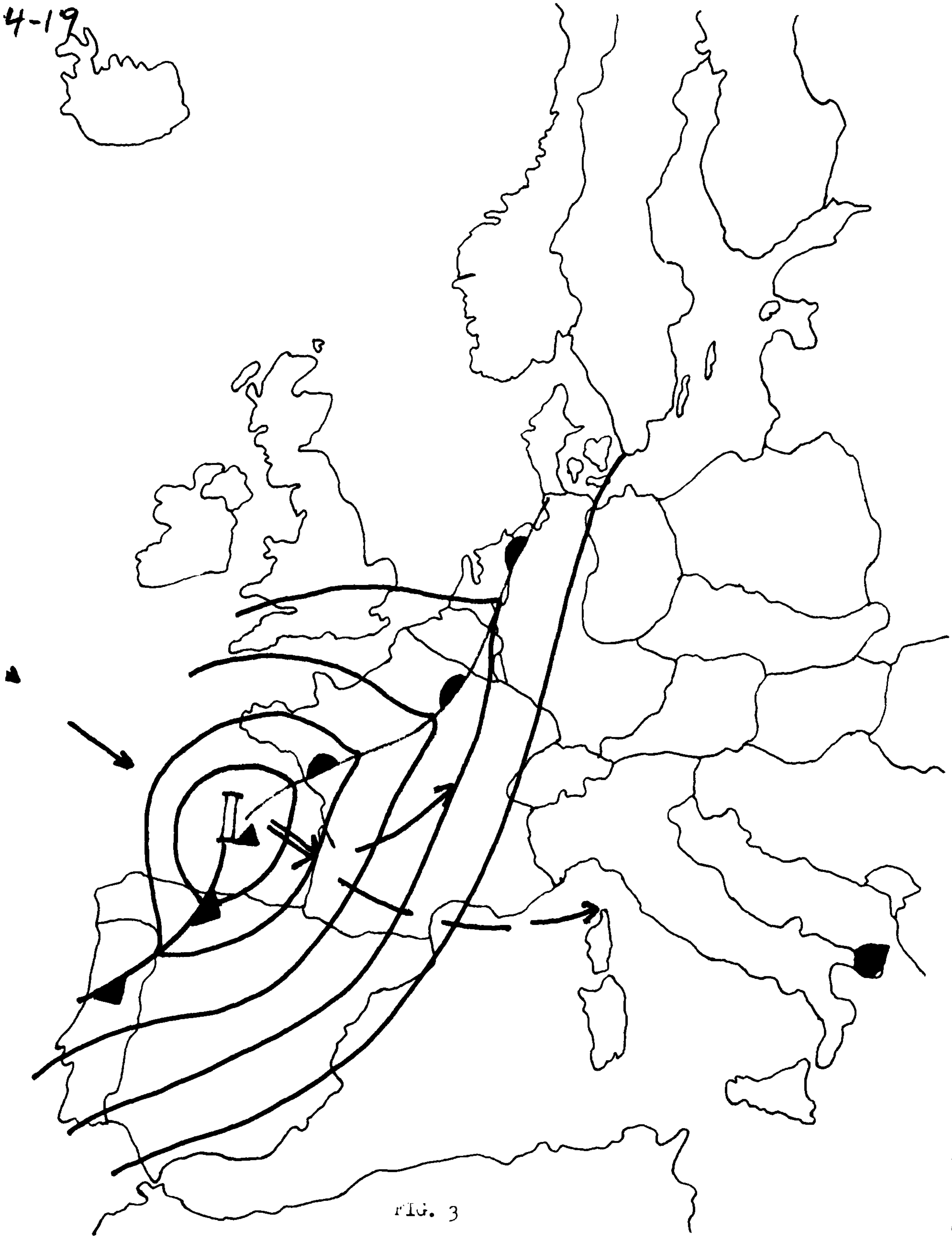

FIG. 3

STATIONARY "SIBERIAN HIGH" (FIG. 4)

An intense stationary "Siberian High" may develop at any time of the year. This high begins to build up over eastern Europe, becomes stationary over Finland or Sweden, and brings cold, dry Arctic air into central Germany during the winter months. The first 24-48 hours of this condition bring low stratus and light snow during the daytime and fog at night and in the mornings. Often a cold front forms over eastern Germany. This front is easily defined by the presence of a snow pattern and low ceilings. This weather pattern moves slowly southwestward. After modification of the air mass has occurred, very cold temperatures and clear to scattered skies will occur. Many ice crystals are observed during the night and morning hours. During the summer, extensive fog, poor visibilities (near zero), and sometimes stratus occur as a result of the clear skies and radiation during the nights. Visibility will normally improve to 3-5 NM by noon, and scattered cumulus clouds will form during the afternoons.

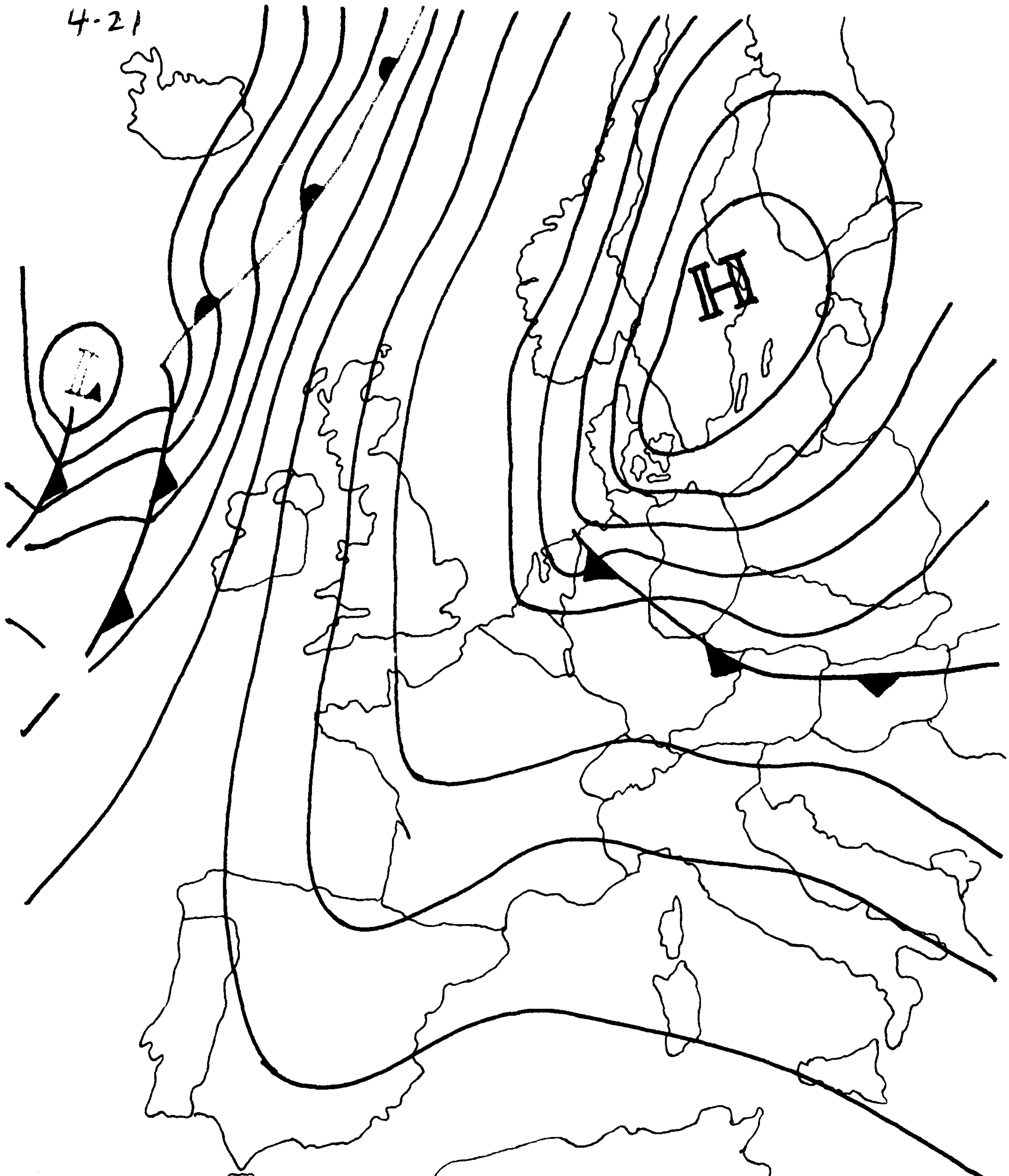

FIG. 4

DATE
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