RESULTS FROM THE AUTOMATIC SWISS DOSE RATE MONITORING NETWORK NADAM

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INTRODUCTION

The swiss Network for Automatic Dose-rate Alarming and Monitoring, NADAM [1,2], is operated by the National Emergency Operations Centre. Since may 1987 the fully operational network covers the whole country with 51 stationary radiation monitoring equipements (Fig. 1). This network shall

- signal immediately a significant increase of the environmental exposure rate,
- enable the National Emergency Operations Centre to distinguish between the natural variation of the environmental radiation level and an artificial increase and
- give a rough survey of the environmental radiation levels over the whole country in a case of a nuclear accident with relase of airborne radioactivity.

The NADAM-stations are equipped with Geiger-Müller-counters and connected to the automatic weather-monitoring stations of the swiss meteorological network ANETZ. The local dose rate values and different meteorological parameters (e.g. air and soil temperature, windspeed and direction, amount of precipitation) are transmitted every 10 minutes through a fixed telecommunication network to a central data collecting computer where they undergo a qualitity and threshold check.

One of the mayor task of the National Emergency Operations Centre is to detect artificial increases of the environmental radiaiton level and to inform in such situations the emergency organisation [3]. Therefore it has to distinguish between increases due to natural variation and artifical reasons respectively. This needs a good knowledge of the local meteorological influences on the radiation level.

Since beginning of december 1987 the weekly mean values of the dose rate mesurements are regularly published and commented in the bulletin of the Federal Health Office [4].

MEASUREMENTS, RESULTS AND DISCUSSION

The following example shows the special influence on the hourly and daily variation of the dose rate by different meteorological parameters, i.e. air- and soil-temperature, humidity, precipitation due to the local situation.

Figure 2 shows the diurnal variation of dose rate at the NADAM-stations of Bern-Liebefeld (BER) and Payerne (PAY) together with the precipitation-values for a given period in march 1986. Shortly after midnight on 13th. there can be detected a sharp peak for the radiation values at both stations. A similar peak could also be found at other stations in the western part of switzerland. This increase could be related to precipitations in this region.

In the preceding and following nights we could find peaks too, but only in Bern-Liebefeld. They show a different shape with a steady increase from about 6pm to 8am followed by a steep decrease within about 2 hours. For this peaks there couldn't be found any relations to precipitation. The analysis of the meteorological datas and the weather-reportings of the gone weather (tab. 1) gives following results:

This increases are positively correlated to humidity (correlation-coeffizient r=0.74-0.94; Fig. 3) and to the temperature gradient between air- and soil-temperature (r=0.29-0.79) and negatively to the soil temperature (r=-0.62 to -0.90). They are also related to haze or fog respectively together with white frost.

We suppose that this special behavior of Bern in relation to Payerne is effected by the particular local situations and their influence on the microclimatic conditions: The NADAM-station of Bern is situated in a shallow depression surrounded either by small hills or buil-

dings; the Payerne station is on a lightly flat slope some 10 meters above the valleys ground. Due to this situation of Berne there can arise a shallow see of cold air with no vertical air movement and fog during cold nights (inversion-situations). Therefore it comes to a concentration of radon and its daughters in the lowest air layer and to wet depositions by dew or white frost during fog situations. In Payerne the cold air will flow downward and there are much less fog situations as table 1 shows.

REFERENCES

[1] Ribordy L., Michaud B., Honegger P. Huber O., Wicht F.: "NADAM, ein landesweites Netz für die automatische Fernmessung der Ortsdosisleistung in der Schweiz", Bericht der 16. Jahrestagung des Fachverbandes für Strahlenschutz e.V., FS-83-30-T, München, 1982.

[2] Honegger P., Michaud B., Ribordy L., Wicht F., Huber O.: "NADAM, das schweizerische Netz zur automatischen Überwachung der Umgebungsstrahlung,Versuchsbetrieb und erste Ergebnisse", Proc. of the VIth. International Congress of IRPA, Berlin (West), 7.-12. May 1984.

[3] Michaud B., Ramelet J., Schmid O., Imobersteg U.: "Improved emergency organisation for the protection of the public in case of nuclear accidents", this proceeding.

[4] Bulletin des Bundesamtes für Gesundheitswesen, Hallwag AG, Bern

observation date and time (UTC)		gone weather during the last 6 or 12 hours for BERNE	PAYERNE
10th.	0600	hazy	hazy
	1200	hazy	hazy
	1800	hazy	hazy
11th.	0600	hazy	hazy
	1200	hazy	hazy
	1800	hazy	hazy
12th.	0600	hazy, white frost	hazy
	1200	hazy, white frost	drizzle
	1800	hazy	no spec observ
13th.	0600	fog, white frost	hazy
	1200	fog, white frost	hazy
	1800	drizzle	hazy
14th.	0600	fog, snowfall	snowfall
	1200	fog	snowfall
	1800	hazy	no spec observ
15th.	0600	fog	hazy
	1200	no spec observ	hazy
	1800	drizzling	no spec observ
16th.	0600	fog, snowfall	no spec observ
	1200	fog	no spec observ
	1800	fog, snowfall	no spec observ
17th.	0600	snowfall	no spec observ
	1200	no spec observ	no spec observ
	1800	no spec observ	no spec observ
18th.	0600	no spec observ	no spec observ
	1200	no spec observ	no spec observ
	1800	no spec observ	no spec observ
19th.	0600	snowfall	snowfall
	1200	no spec observ	rain
	1800	fog, snowfall	rain-sonfall
20th.	0600	fog, snowfall	snowfall

Tab. 1: Weather-reporting for Bern-Liebefeld and Payerne for march 10th. to 19th. 1987. Observed weather-phenomenon during the last 6 or 12 hours respectively.

Fig 1:

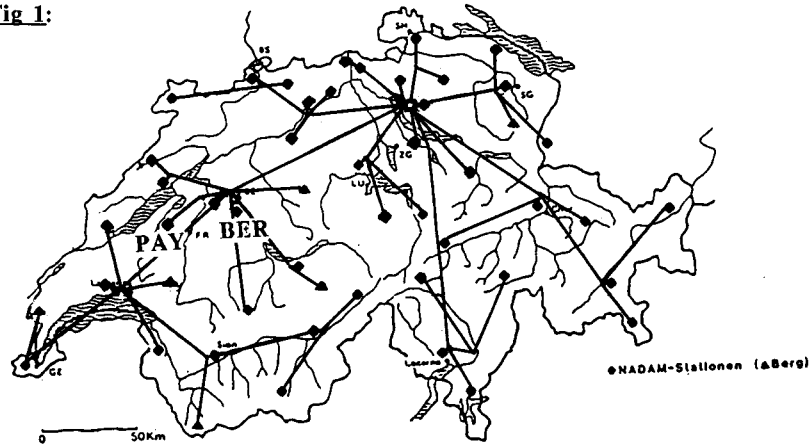

Fig 2: comparison of dose rate with different meteorolgical parameters

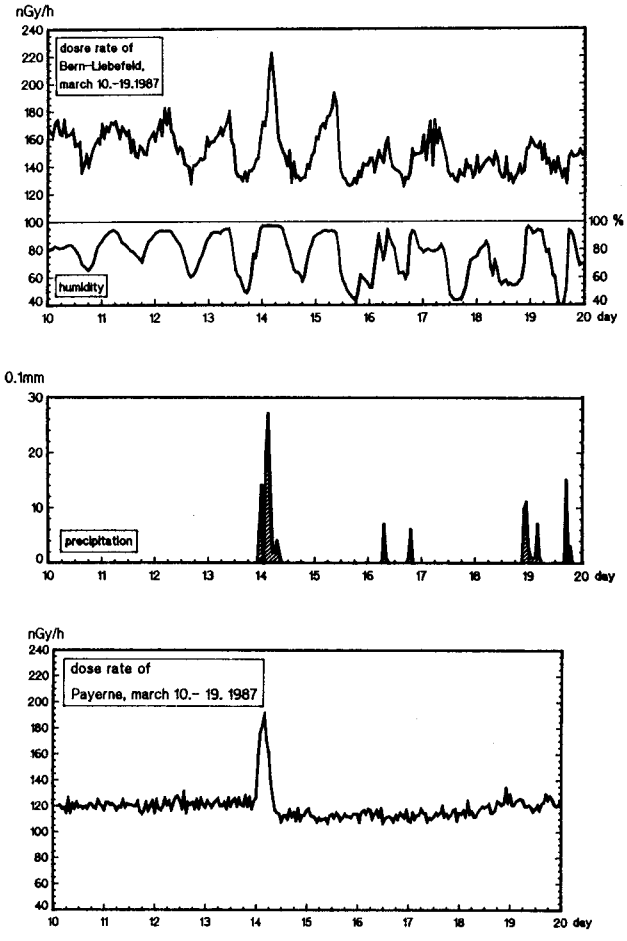

Fig 3: Correlations for Bern-Liebefeld, march 15th. 1987