

RESEARCH COMMUNICATIONS

interacting variables where one of them has a self-limiting growth.

We invite from the readers, any comments, criticisms as well as suggestions towards a further progress in this important problem which is both scientific as well as social.

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On the occurrence of lava flows from Krol Formation, Narendranagar area, Garhwal Himalayas, Tehri-Garhwal district, Uttar Pradesh

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We report here the occurrence of lava flows in the Krol Formation, hitherto thought to be 'essentially a carbonate facies with evaporite beds in the middle section'¹.

THE generalized geological map of the area around Narendranagar with locations of volcanic flows is given in Figure 1. Table 1 gives generalized lithological characters of the mapped sequence.

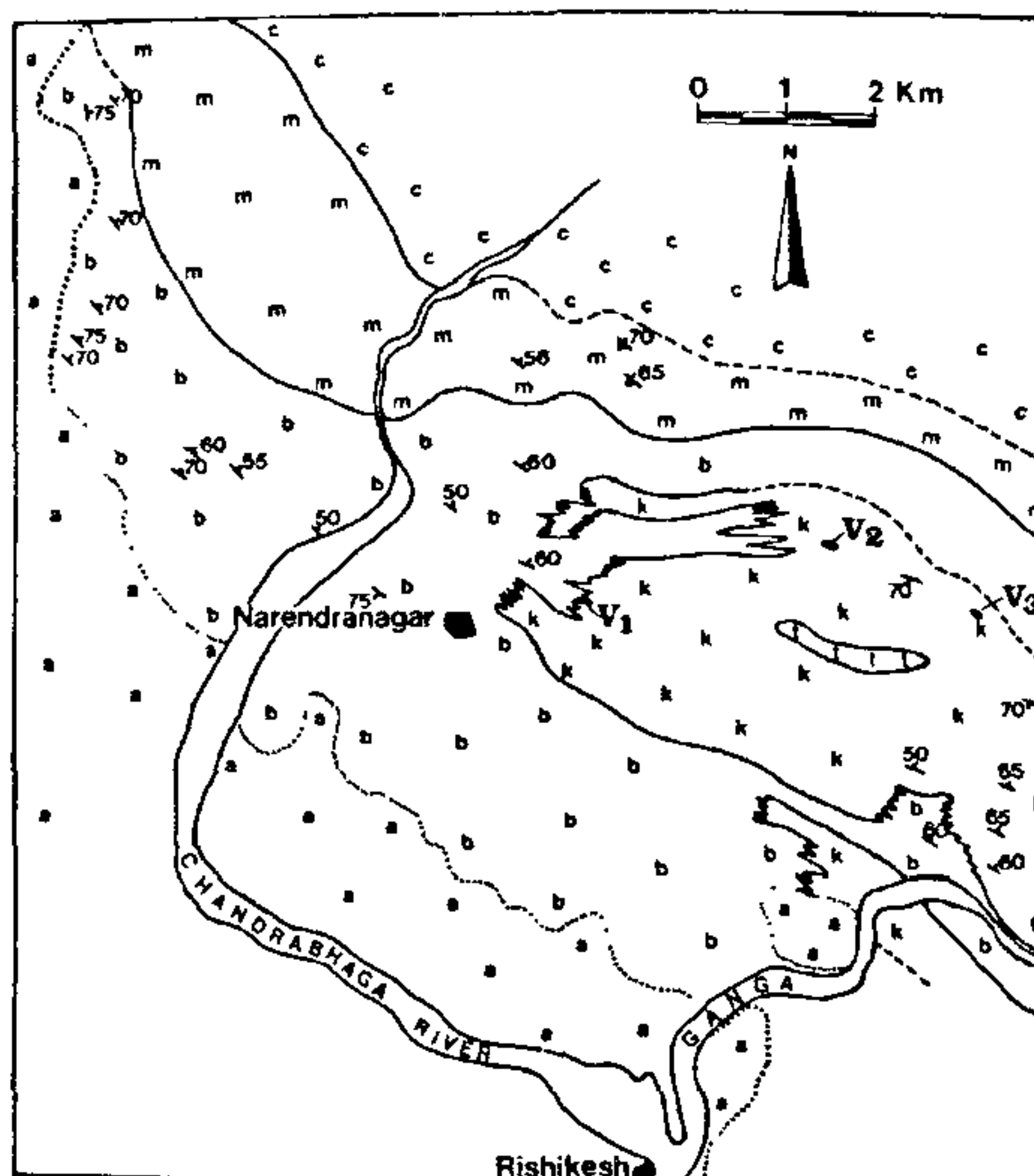


Figure 1. Geological map of the study area. c: Chandpur Formation, m: Mandhali Formation, b: Blaini Formation, k: Krol Formation, t: Tal Formation, a: Alluvium. V₁, V₂, V₃ are the locations of the lava flows.

Table 1. Lithological characters of the sequence exposed in the study area

Formation	Lithology
Tal Formation	Light grey to greenish grey splintery shale
Krol Formation	Light to dark grey and bluish grey limestone and dolomite with interbands of red, light to dark grey and occasionally black shale. Occurrences of thin lava flows and minor gypsum
Blaini Formation	Diamictite, quartzite, grey and purple shade with lenticular limestone
Mandhali Formation	Dirty white quartzite and dark grey phyllite
Chandpur Formation	Dark grey slate, phyllite and subordinate quartzite

The highly altered lava flows are brownish green to dark brown in colour with thickness varying from a fraction of a metre (about 30 cm) to about a metre. They have fine grained, aphanatic texture and sparsely amygdaloidal character.

In thin sections, the samples exhibit fine grained, merocrystalline character and have dominantly subophitic, intersertal, intergranular and occasionally inequigranular, porphyritic texture.

When porphyritic, the microphenocrysts of plagioclase ($\leq 5\%$ by volume) usually occur as individual grains and are seldom seen forming glomerophytic

aggregates. They are subhedral, lath-shaped and are altered to clayey aggregates. At places, they contain inclusions of clinopyroxene, opaques and glassy droplets in their cores.

In groundmass, plagioclase and clinopyroxene (average $C\bar{Z}=36\%$: augite) together show subophitic texture. The anhedral to subhedral, prismatic opaque grains occupy polygonal interspaces left by plagioclase and/or clinopyroxene and thus exhibit intergranular texture. Invariably altered, dirty moss green to yellowish brown glass forms irregular intersertal patches in the groundmass and the inner linings of the vesicles. The central portions of these cavities are filled by a variety of cavity minerals including quartz and zeolites (Figure 2a and b).

The textural and mineralogical characters indicate the rock to be 'basaltic' in character.

Keeping in view the controversial stratigraphic position of the Krol Formation²⁻¹², it is felt that further efforts must be made to i) identify and map the lava flows in Krol sequence, and ii) study their geochemical and isotopic characters. Such studies will

not only help in understanding the basin evolution but may also offer 'much wanted' geochronological data for assigning either the late-Proterozoic or Permo-Carboniferous age to the controversial Krol sequence.

The thin sections studied as a part of this study have been registered in the Petrology Division, Geological Survey of India (NR), Lucknow, under the registration number TS/3/302 and TS/3/303. The support of the Training Institute, Geological Survey of India, is gratefully acknowledged.

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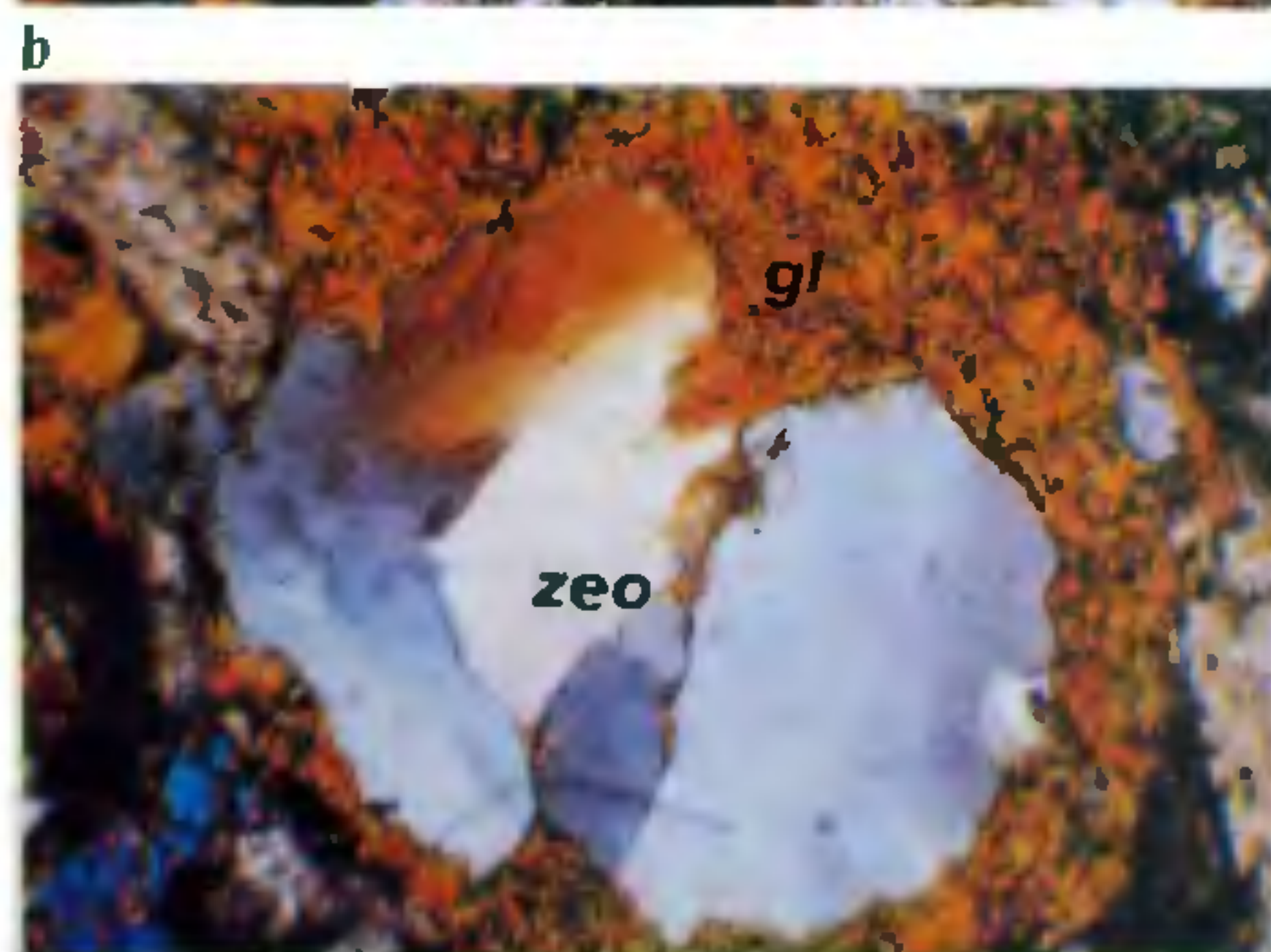
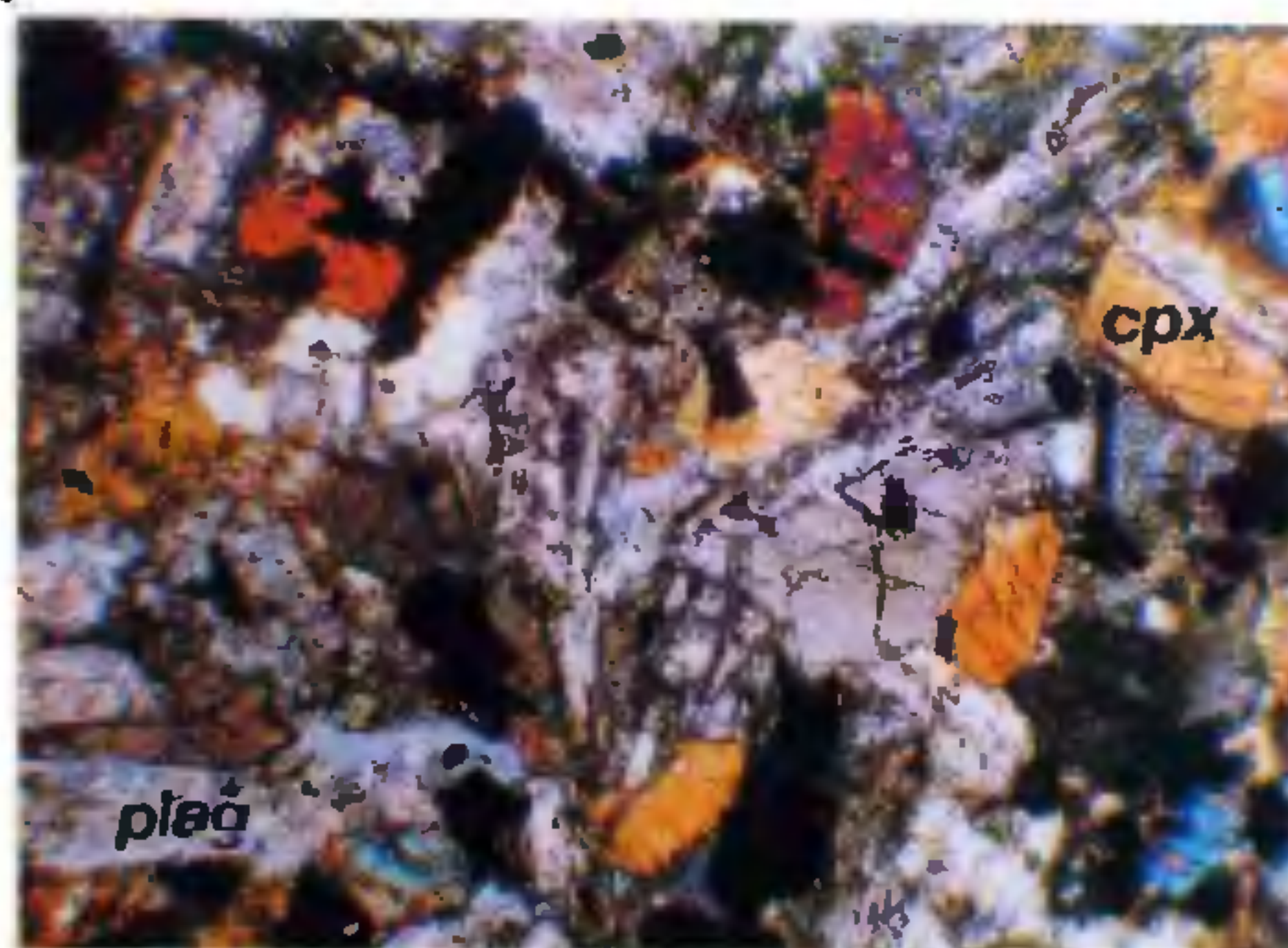


Figure 2. Photomicrographs showing the textural characters of the Krol lava flows. a, cpx: Clinopyroxene, plag: Plagioclase. Between X nicols b, zeo: Zeolite, gl: Altered, glassy, inner lining of the amygdale. Between X nicols.

Heavy metal concentrations in air, water and rock samples at Antarctica during 1989-1990

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Concentrations of lead, cadmium, zinc and copper have been measured in air particulates and seawater samples collected enroute to Antarctica and at the Indian station Maitree (11 44' E, 70 45' S) at Antarctica for the period December 1989 to February 1990 during the IX Indian Expedition. The analysis was carried out using highly sensitive technique of differential pulse anodic stripping voltammetry (DPASV). The atmospheric concentrations as well as seawater concentrations showed a decreasing trend towards Antarctica except near Mauritius island. The atmospheric concentrations of lead at different locations at Maitree varied between 0.23 and 0.41 ng m^{-3} and that of copper varied between 0.4 and 1.7 ng m^{-3} . Levels of lead, cadmium, copper and zinc were also measured in different types of rock samples collected around the Maitree station. Some of these findings are briefly discussed here.

ANTARCTICA is very well known to be the reference point for all environmental and pollution studies because of