



The “seven-coloured earth” of Chamarel, Mauritius

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ARTICLE INFO

Article history:

Received 11 March 2009

Received in revised form 21 July 2009

Accepted 23 July 2009

Available online 6 August 2009

Keywords:

Mauritius

Chamarel

Basalt

Weathering

Rills

Coloured earth

ABSTRACT

The “seven-coloured earth” of Chamarel is a geological curiosity and a major tourist attraction of Mauritius. This is a small (~7500 m²) area of strikingly bare landscape showing well-developed rills and various shades of red, brown, grey, and purple. Curiously, it is located within a large, dense forest. Prevalent misconceptions are that the landscape formed due to a volcanic eruption, or from volcanic ash. Whereas the bedrock is undoubtedly an old volcanic rock (basalt), the colours are due to weathering of the basalt and the formation of secondary iron oxides and hydroxides in it, and the rilling is a result of deforestation and sheet erosion, i.e., human modification of the landscape. Such features, inadequately described in the literature so far, also occur in Papua New Guinea, and may be common in tropical, high-rainfall regions with volcanic bedrock.

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1. Introduction

The “seven-coloured earth” of Chamarel is a geological curiosity and one of the major tourist attractions in Mauritius, a small African island country in the Indian Ocean (Fig. 1) that has a growing tourism industry. The seven-coloured earth is a small (~7500 m²) site in the Black River district of southwestern Mauritius. Though in the heart of a large, dense forest, it is strikingly devoid of any vegetation. It is a landscape with severe rill erosion and surface colouration in various shades of red, brown, grey, and purple that gives it its name (Fig. 2a–d).

The site is on private land and a fee (75 Mauritian rupees per person in June 2008) is charged for entry to the seven-coloured earth as well as the beautiful Chamarel waterfall on the same premises. Searching “Chamarel” in Google, or in the scientific literature (e.g., Elsevier’s ScienceDirect) produced no results of a technical nature. We present the geological and geomorphological background to the Chamarel seven-coloured earth, so that this, and similar features known elsewhere but insufficiently described, are better understood.

2. Some misconceptions

Widespread misconceptions exist about the seven-coloured earth. Links to volcanoes are indicated by enthusiastic tourists. A

tour guide we met at the site told us very confidently that the different colours (and the puzzling total absence of vegetation we pointed out to him) were “due to a volcanic eruption”. A particular traveller’s website that we hit with Google (by searching “Chamarel”) says that the different colours are developed due to different lava flows cooling at different temperatures. These conceptions are quite mistaken.

The island of Mauritius is indeed volcanic, but volcanism ended long ago. The shield stage of volcanism, which built up most of the island itself, is 8 million years old, and the youngest volcanic activity occurred 30,000 years ago (McDougall and Chamalaun, 1969; Baxter, 1972, 1975, 1976; Sheth et al., 2003; Paul et al., 2007). The bedrock at Chamarel is volcanic rock (basalt) that has been considerably weathered. The basalt lithology cannot be ascertained at the site itself, as this site is fenced off, denying access to tourists. However, 1.3 km away the spectacular Chamarel Falls plunge a hundred metres or so over two cliff-forming basalt lava flows, the upper one of which shows well-developed columnar jointing (Fig. 3a).

Saddul (1995) considers the seven-coloured earth as formed on altered volcanic tuffs. He writes that the tuffs are as much as 18–20 m thick and overlie basalt lavas with a sharp contact. He speculates that the volcanic tuffs are derived from the Bassin Blanc volcano nearby (Fig. 1), which we have not visited. His view is echoed in The Mauritius Telephone Directory “tourist information”, which states: “These slivers of colours are believed to be the result of the erosion of the volcanic ash”. This sentence confuses erosion, meaning removal of rock material, with weathering or alteration, which happens to the rock in place. The same Directory refers to

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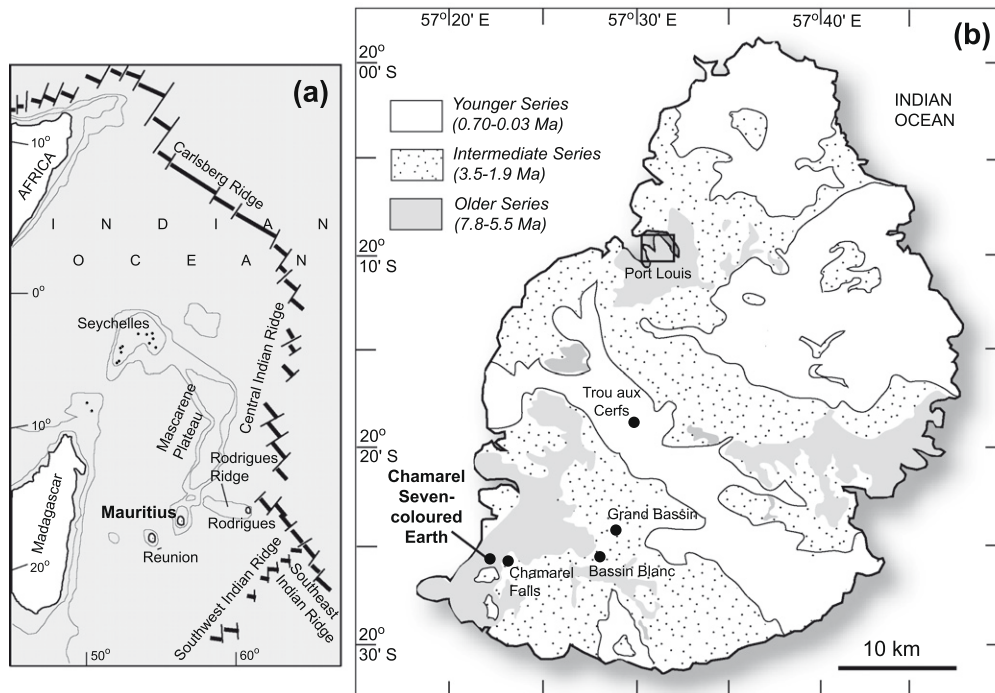


Fig. 1. (a) Map of the Indian Ocean region showing the locations of the three Mascarene Islands (Réunion, Mauritius, and Rodrigues) and major physical and tectonic features. Based on Sheth et al. (2003). (b) Simplified geological map of Mauritius, showing the presently recognized areal distribution (Paul et al., 2007) of the Older, Intermediate, and Younger Series lava flows (as defined by Baxter, 1972, 1975, 1976), their K–Ar ages in millions of years (McDougall and Chamalaun, 1969), and the locations of the geological features described in this study. Small islets offshore Mauritius are not shown.

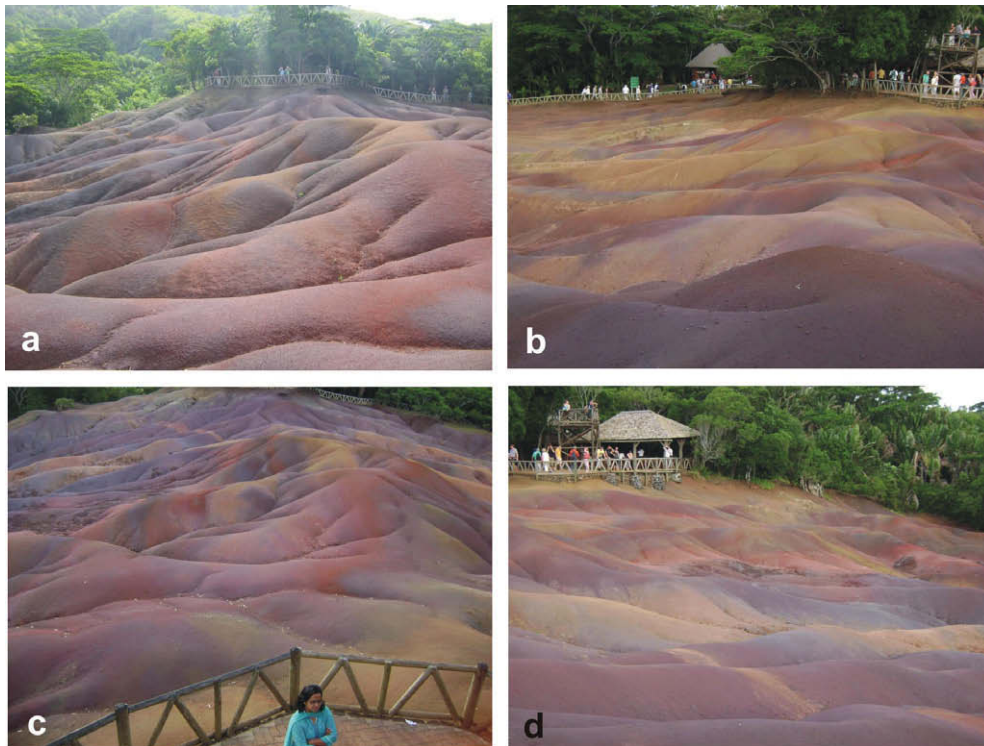


Fig. 2. Photographs showing the Chamarel seven-coloured earth landscape. (a) Dendritic drainage pattern, with rounded interflues and V-shaped valleys. (b, c, d) The various colour shades. (c) A minor watershed crossing the area, and drainage going off to both right and left, illustrating the 'normal' dendritic drainage pattern of the rills. It also shows the occasional bits of gravel (apparently white) along the drainage lines. (d) This shows the general steepness of the ground. Note the great contrast between the bare area and the forest beyond in (a) through (d).

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