

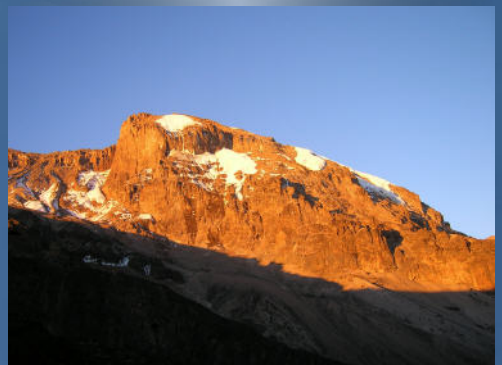
NORTHERN KILIMANJARO ECOLOGICAL RESEARCH STATION

A Preliminary Assessment of
the viability of siting an
Ecological Research Station
in the
Northern Kilimanjaro Area

A collaborative effort of:



www.teamkilimanjaro.com



MARCH 2006

NORTHERN KILIMANJARO ECOLOGICAL RESEARCH PROGRAMME

Report Following Preliminary Assessment

INTRODUCTION

Ecology: Claims are made widely, of varying degrees of academic corroboration, that Kilimanjaro's glaciers will disappear entirely sometime between 2015 and 2025 and that the result of this for local populations will be severe droughts and enforced migration. There is however, at present not the continued specialist presence on the mountain conducting frequent and systematic year-round surveillance of Kilimanjaro's glaciers and rivers that would be required in order for us to build an accurate prognosis of what will be the likely effect of Kibo's ongoing glacial recession and the consequences of this in terms of depleted water supplies for the region.

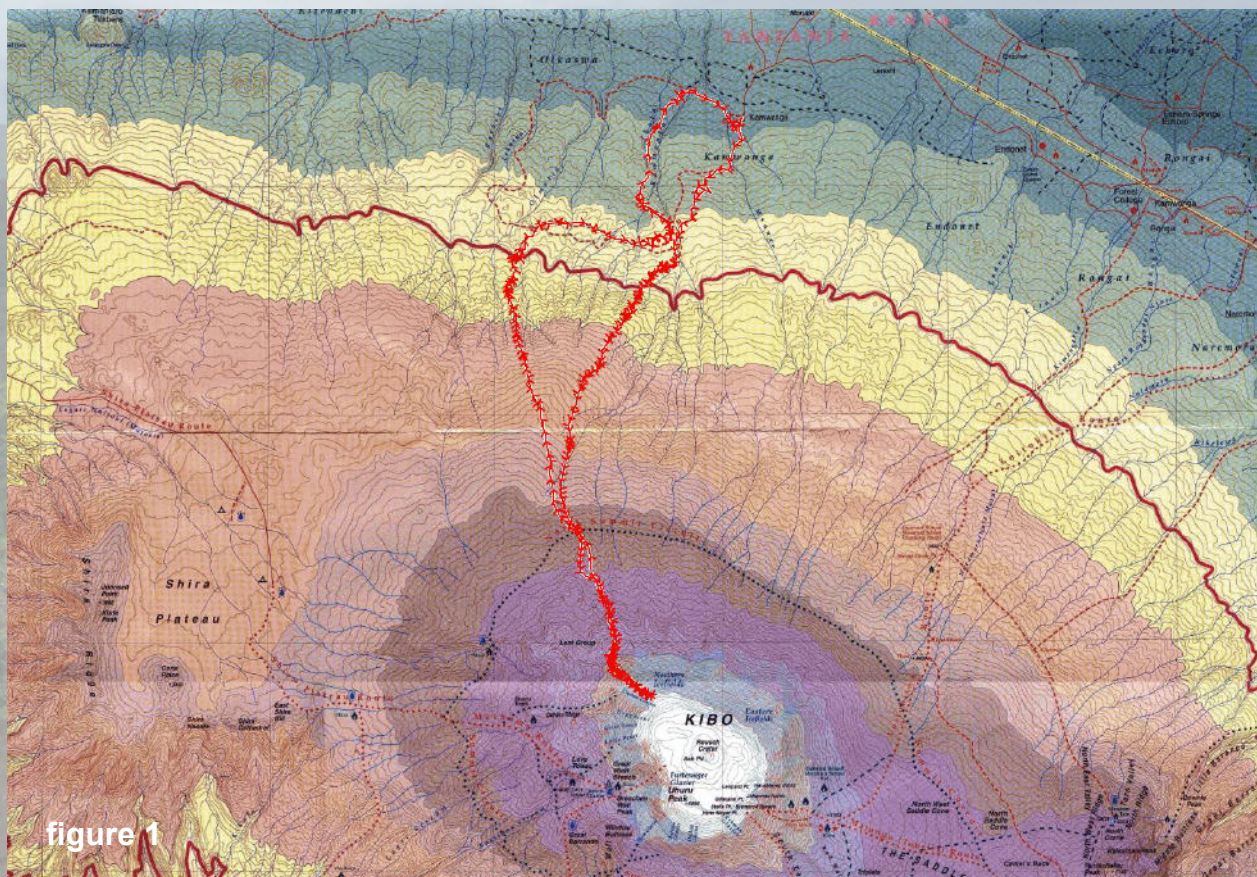
Mountain Safety: Kibo's Western Breach has long been renowned for rock fall and is known to be a relatively dangerous summit assault option. However, in recent years causes of rock fall in the Breach have increased from deterioration of the crater wall only, to now include subsidence of accumulated residual glacial deposits also, as glaciers overhanging the climbing route recede. There is as yet no systematic programme of route assessment to verify that the currently employed assault routes (ie. via Gilman's Point, Barafu Rib and the Western Breach) are optimal in terms of climber safety considerations.

PROPOSAL

To address these arguably very urgent needs it is therefore proposed to have an Ecology Programme sited on the northern side of Kilimanjaro away from the mountain's main tourism interests, where it will be possible to launch regular patrols by specialized teams of mountaineers, working with both commissioned scientists and ecology programme volunteers, to key locations on the mountain in order to catalogue and quantify the changes being undergone on the mountain as a probable result of global warming, and to report these findings regularly to the appropriate authorities in order to better inform future legislative decisions that will best allow the achievement of the National Park's objective of conservation through sustainable development for Kilimanjaro.

BACKGROUND TO THE REPORT

At 4:30pm on 7th March a Team Kilimanjaro expedition left the KINAPA base at Kamwanga Forest Station (2°54.7'S, 37°21.9'E) and proceeded south to 5495m at the northern tip of the Credner Glacier, returning to Kamwanga at 1:30pm on 10th March. En route the expedition mapped the optimal route for a minimal impact conservation trail to Kilimanjaro's icefields that will avoid the mountain's main tourism interests and provide a relatively safe means of allowing small teams of scientists and ecology programme volunteers to ascend to a number of proposed surveillance subjects on Kibo. A photo-survey of intersected waterways was also conducted. The route appears below, (reconnaissance ran clockwise from top right):



PRIMARY RECONNAISSANCE

The expedition found that the only dangers associated with the route were a minimal risk of confrontation with elephant and buffalo. No actual species were seen over the three days and 55.7km that were covered during the reconnaissance, however tracks of buffalo and elephant were evident, as well as a number of antelope species. The threat posed by wild animals is, however, one that can be easily contained by mandating that future patrols be equipped with either a Short Range Directional Acoustic Device or a Photonic Disruptor, both of which will deter wild animal confrontations without the need for lethal force to be deployed where an encounter is unavoidable.

On the higher sections a minimal danger of rock fall was discovered though of appreciably less danger than alternative assault options on Kibo with rock fall paths being easily predictable. It should however be noted that care would need to be taken to site the proposed high camp at 4920m as close to the site's northern edge as possible in order to minimise risk of impact from rock fall. Ascent to the crater on this route requires specialist mountaineering equipment and full logistical support for scientists and ecology programme volunteers.

The main obstacle to the progress of the expedition was found to be an absence of any running water throughout the entire route from 2510m upwards. A survey was conducted with intersected waterways photographed as follows:



Msanga River at 2211m
completely dry



Water Point at 2510m
*diverted from Kamwanga East River,
last water point en route to crater*



Kamwanga East at 2574m
*stagnant pools of water following
recent rains*



**A Tributary of
Kamwanga East at 3250m**
stagnant pools of water



**A Tributary of
Kamwanga East at 3607m**
*water from stagnant pools is
boiled to be made safe for
drinking (left & right)*





figure 8

During the descent from the Credner Glacier to Kamwanga additional water points were investigated to the west of the proposed Northern Service & Surveillance Route:

An Eastern Tributary of Olmatio River at 2753m

flow rate est. 4 litres per minute

note: following recent rainfall



figure 9

Eastern Tributary (see fig. 8) of Olmatio River at 2748m

estimating the flow rate at 4 l / min



figure 10

The Kamwanga River at 2020m

completely dry



figure 11

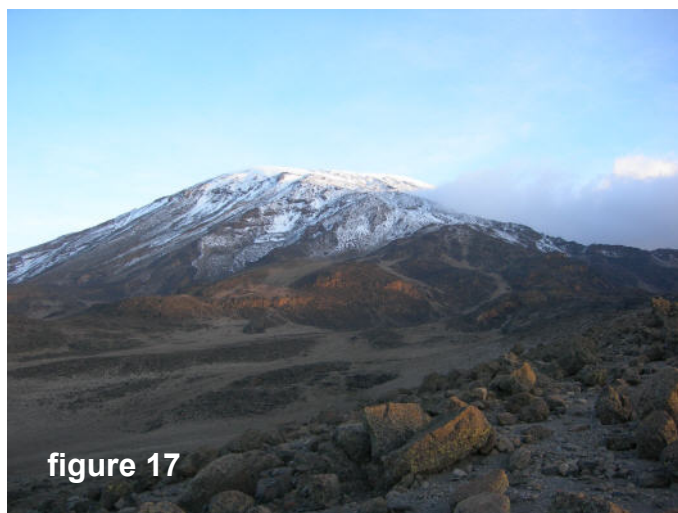
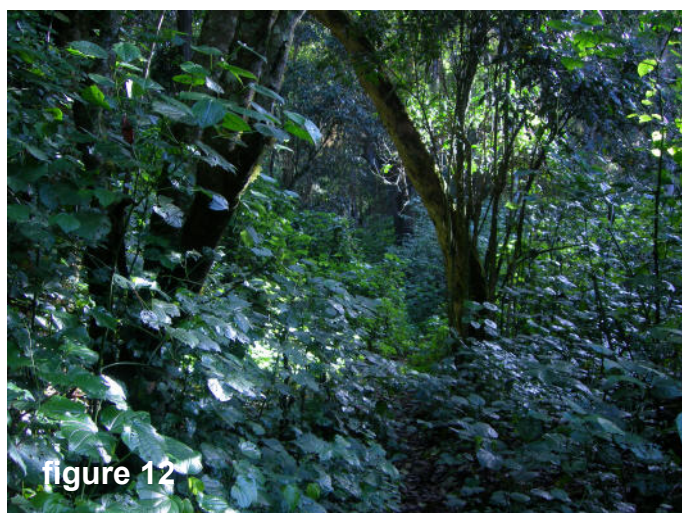
The Msanga River at 2058m

completely dry

THE ROUTE PROPOSED

See figure C1, Appendix C, showing the northerly course beginning at Mlima Nyuki. From the village the 34.8km route proceeds through:

- 10.9km of lower montane Agauria-Ocotea / montane Cassipourea indigenous forest from 1771m to 2570m, (figure 12), becoming interspersed with :
- sections of subalpine Juniperus forest from 2500m to 2570m, (figure 13)
- 4.3km of subalpine Hagenia forest to an altitude of 2825m, (figure 14), where it emerges onto:
- 4.0km of Erica trimera bush from 2825m to 3415m, (figure 15)
- 4.7km of Helichrysum newii vegetation from 3415m to 4170m, (figure 16)
- 6.7km of bare rock and scree from 4170m to 5495m, (figure 17)
- 4.2 km of glacier and scree from 5495m to Furtwangler Glacier photo-surveillance point at high point on crater rim, 5889m, (figure B2, Appendix B).



THE ASSAULT

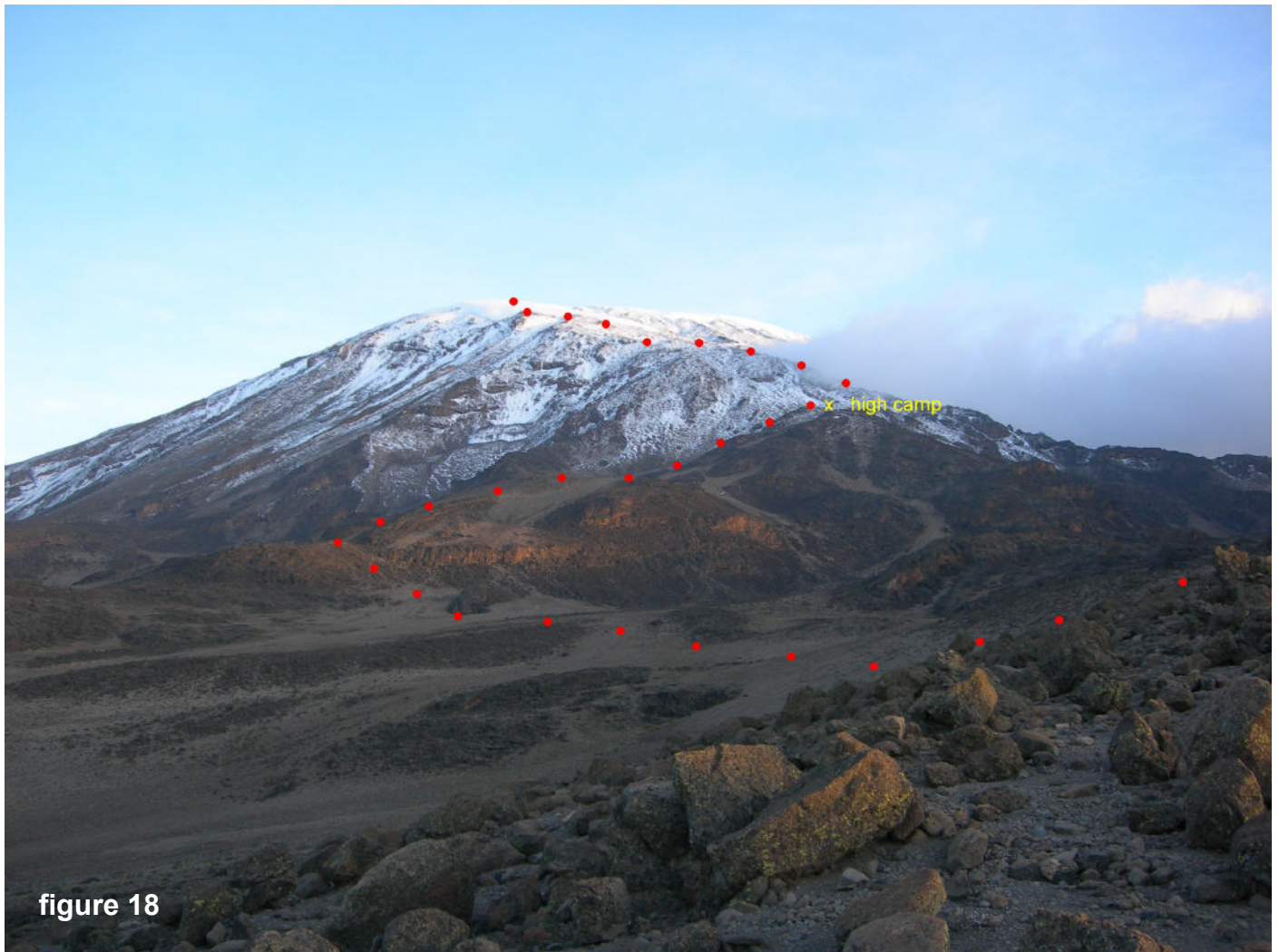


figure 18

See figure 18 (above), photographed from 4332m, near to Camp 2. From this point the route climbs a further 20 metres along this ridge before dropping 45 metres to where the route crosses the final re-entrant before attaining Kibo's north west spur at 4480m. An acceptable bivouac location is reached on the eastern side of the prominent rock spine (9th red dot) at 4420m. Having attained the spur the ascent is straightforward until 4665m where it steepens and the scree becomes looser. From 4770m the ascent should tightly handrail rock rib until arriving at the high camp site at 4920m (see figures 19 & 20, below). From High Camp route follows same line to attain final ridge (figure 21) where it turns left to follow ridge line to Credner Glacier's northern edge at 5495m (see figures 25 & 26).

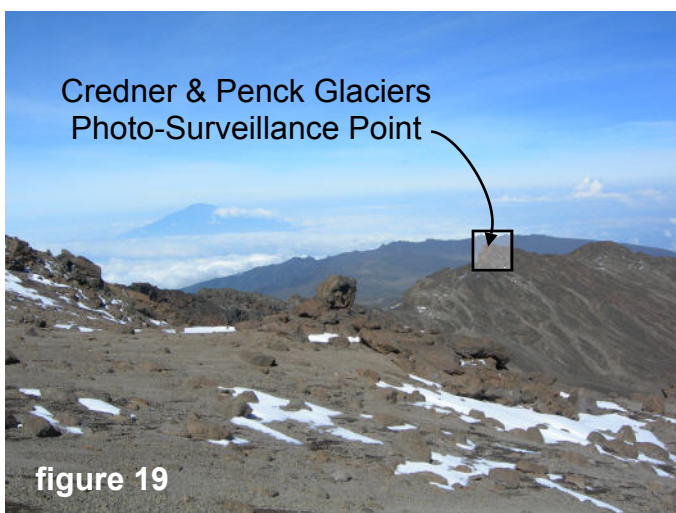


figure 19

View from High Camp at 4920m
*looking west over the Lent Group (near horizon at right);
across Shira Ridge (mid-horizon, right) to
Mount Meru (68.8km on bearing of 251°)*

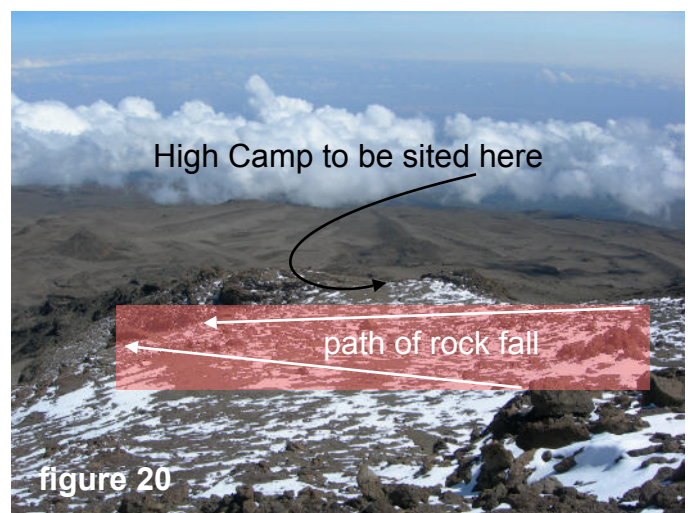


figure 20

View of High Camp from 100m above
*care should be taken to avoid obvious rock fall path
when siting camp at this location*



figure 21

final ridge to Credner Glacier
*looking south east towards Uhuru (not visible).
 The route runs diagonally upward, left of picture.*



figure 22

remains of the Credner Glacier at 5200m
*looking upward from 5140m. Marked recession has
 occurred in recent years with very little now remaining*



figure 23

remains of the Credner Glacier at 5450m
*survey is proposed from this point to glacier's snout, be-
 low, where altitude and GPS co-ordinates should be
 regularly recorded throughout year*



figure 24

point where north west spur meets Credner Glacier
*just beyond rock outcrop route turns right to attain
 Credner Glacier. From which point crampons and
 ice-axe are required*



figure 25

northern tip of Credner Glacier
*this edge to be marked with surveying rods and GPS co-
 ordinates logged with regular patrols surveying this site
 in order to record the recession over time*

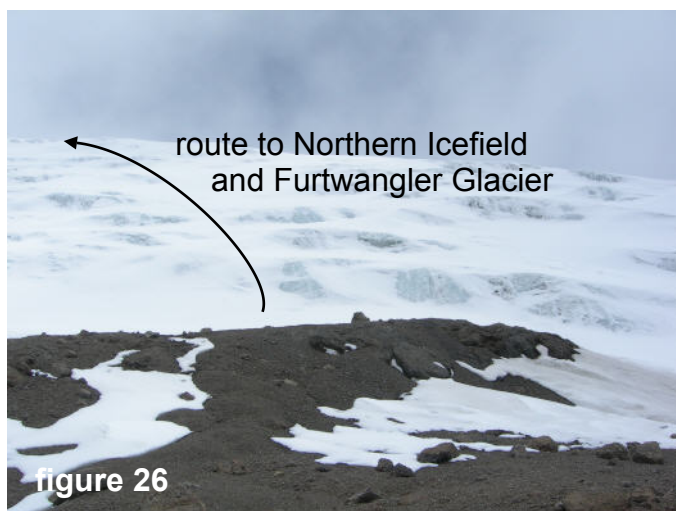
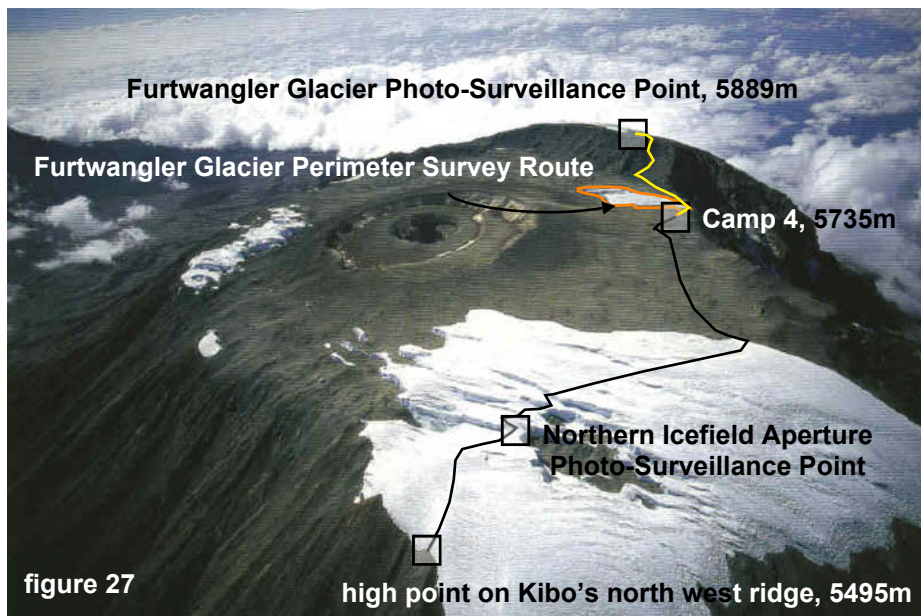


figure 26

Credner Glacier entry point at 5495m
*this location is highest point on Kibo's north west spur
 and represents a safe base from which to survey the
 Credner Glacier's northern side*



From the head of the north west ridge of Kibo at 5495m the route mounts the glacier at the point at which the Northern Icefield meets Credner Glacier. At this point it will be necessary for members of the survey party to use crampons to facilitate safe passage across the ice. Scientists and programme volunteers should be assisted by a team of trained mountaineers as there are considerable risks associated with inadequate instruction being given to patrol members who are not familiar with ice-crossing equipment.

From Camp 4 perimeter surveys of Furtwangler Glacier to be conducted with captured GPS track logs of the perimeter to be catalogued. Successive perimeter surveys to be compared, yielding results quantifying glacier's recession over time.

Further patrol from Camp 4 to 5889m proposed. Frequent high resolution photographs such as figure B2, taken from proposed Furtwangler Glacier Photo-Surveillance Point, to be catalogued with comparisons supporting data for recession estimates.

From Camp 4 the descent to the route's start point is proposed to be via the ascent route, and being divided into two days with the intervening night to be spent at Camp 1, 3250m.

From Camp 2, 4174m, surveillance route proposed to Credner & Penck Glaciers Photo-Surveillance Point at 4759m, see figure C1. Telescopic photographic equipment to be used at this point with images catalogued for future comparison.

From Camp 2, 4174m, surveillance route proposed to Penck and Arrow Glaciers Photo-Surveillance Point at 4688m, see figures C1 and figure 28 (below). Telescopic photographic equipment to be used at this point with images catalogued for future comparison.



RECOMMENDATIONS FOLLOWING PRIMARY RECONNAISSANCE

1. The expedition deems the prospect of siting an Ecological Research Station on the northern side of Kilimanjaro, from which frequent glacial surveillance and river flow-rate patrols could be launched, to be viable, and recommends that such a station be situated within short reach of the main dirt road from Ol Molog to Rongai, a short distance west of Mlima Nyuki.
2. Following the findings of the recent UNEP-sponsored Kilimanjaro forest survey it is further recommended that the proposed Ecological Research Station works with the nearby Kamwanga Forest Station in replanting indigenous trees that have been illegally logged, in an attempt to contribute towards the arrest of Kilimanjaro's de-glaciation, and seeks co-operation with local village leaders in educating local people about the relationship between tree-canopy reduction and the depleted water reserves that will threaten their continued occupation of the region.
3. It is proposed that initial funding for the site preparation and establishment of the proposed Ecological Research Station be sponsored by Team Kilimanjaro and that Team Kilimanjaro undertake to be responsible for route preparation from the Station to the proposed Glacial Survey Base at 5735m, at the company's own expense.
4. In order to ensure the frequent use of the proposed Ecological Research Route that will be necessary to develop a catalogue of accurate observations from which it will be possible to quantify the changes suffered by Kilimanjaro's rivers and glaciers, it is proposed that ongoing funding for commissioning of visiting scientists (geologists, seismologists, glaciologists, etc) and expenses of programme volunteers, be secured by implementation of a fundraising scheme operated by Team Kilimanjaro, which the company has developed to assist NGO's and Charitable Organisations elsewhere in East Africa.
5. It is recommended that regular safety patrols by a dedicated specialist team be sent to survey all standard routes and report findings with recommendations for any route adjustments deemed necessary to best achieve optimal climber safety on all routes. Team Kilimanjaro are willing to train and supervise such a team.
6. It is recommended that a new KINAPA website be launched publishing frequent updates and reports on the current status of all routes on Kilimanjaro and details of the ongoing work that is being conducted to reassure prospective climbers that all reasonable measures are being taken to ensure maximum climber safety at all times.

ARUSHA, Tanzania - Tanzanian President Jakaya Kikwete banned tree felling and harvesting of timber in reserved forest areas in a move aimed at halting rapid environmental degradation, including melting of ice on Mount Kilimanjaro.

"Wanton destruction of trees in mountains has completely ruined our environment. It is now necessary to ban destruction of forests to save the environment," Kikwete told a rally in the country's northern town of Arusha.

Mount Kilimanjaro's legendary crown of snow and glaciers are melting and likely to disappear completely by 2020, triggering major disruptions to ecosystems on the dry African plains that spread out at its feet below, scientists warned last year.

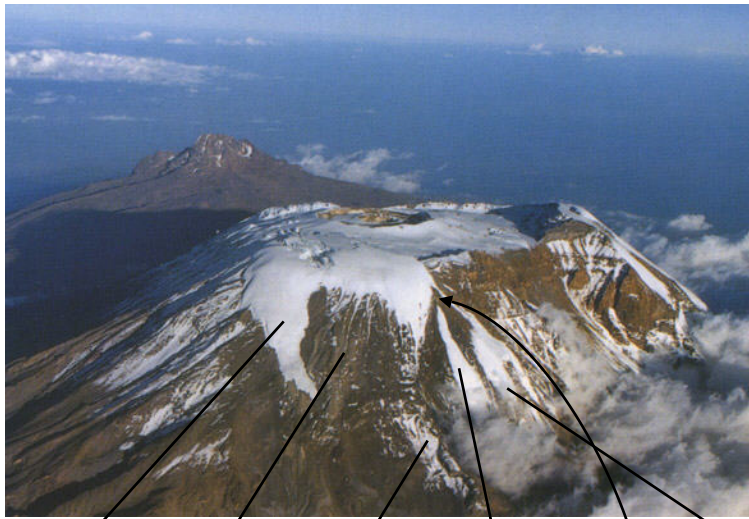
The forests on Kilimanjaro's lower slopes absorb moisture from the cloud hovering near the peak, and in turn nourish flora and fauna below.

The loss of snows on the 19,330-foot (5,892-meter) peak ... could have disastrous effects on the Tanzanian economy, US researchers warned in a 2001 Science article warning about the melting.

"We have to do everything in our power to save our environment ... we cannot watch the destruction carried out by human beings," he stressed, noting that the Kilimanjaro region was notorious for felling of trees.

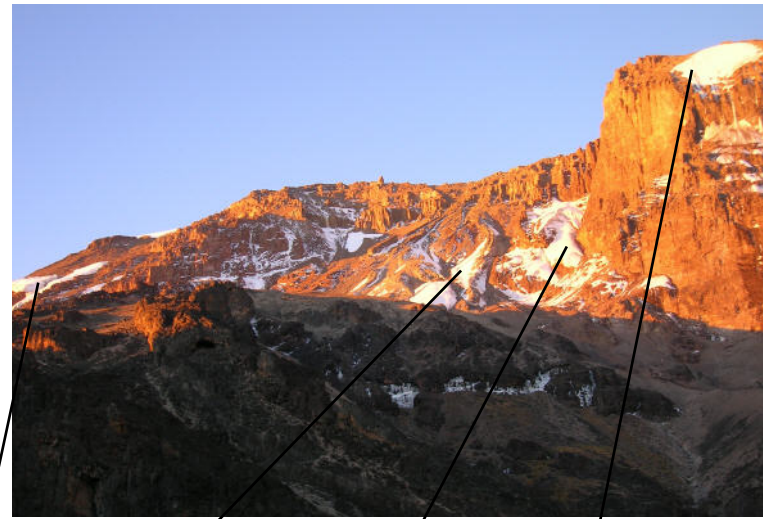
Kikwete also blamed environmental destruction for being a partial cause of drought in Tanzania and other east African nations where millions of people were now at risk of famine and in need of relief food.

Appendix A - The Glaciers of Kibo



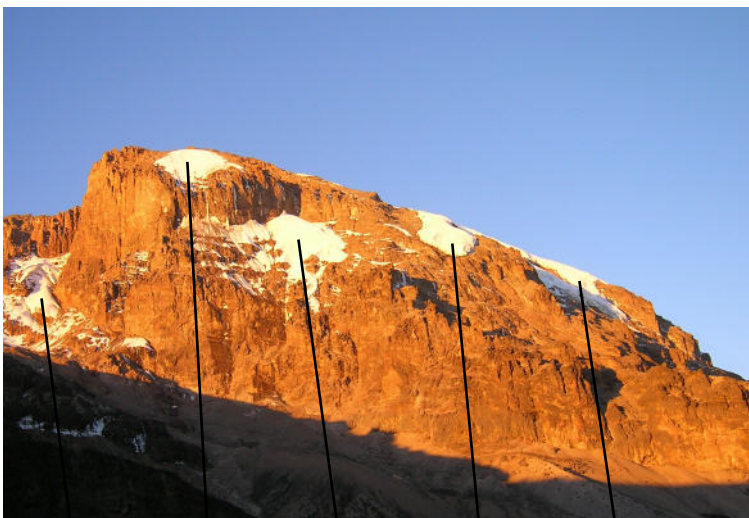
Credner Drygalski Pengalski Great Penck Little Penck

(since this photograph was taken in 2000 there has been considerable further recession, notably with the ice bridge connecting the Little Penck to the Northern Icefield having now completely disappeared)



Little Breach Big Breach Diamond

(July 2005: Western Breach)



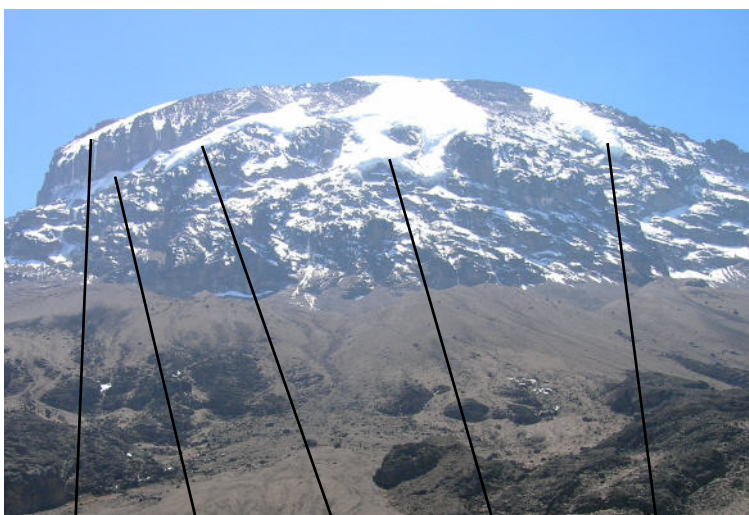
Big Breach Diamond Balletto Heim Kersten

(above, from South West and below, from South: Uhuru, July 2005)



Rebmann Ratzel Northern and Eastern Icefields

(Est 2000, above, & 2003, below.: Aerial Views of Kibo from East)



Diamond Balletto Heim Kersten Decken



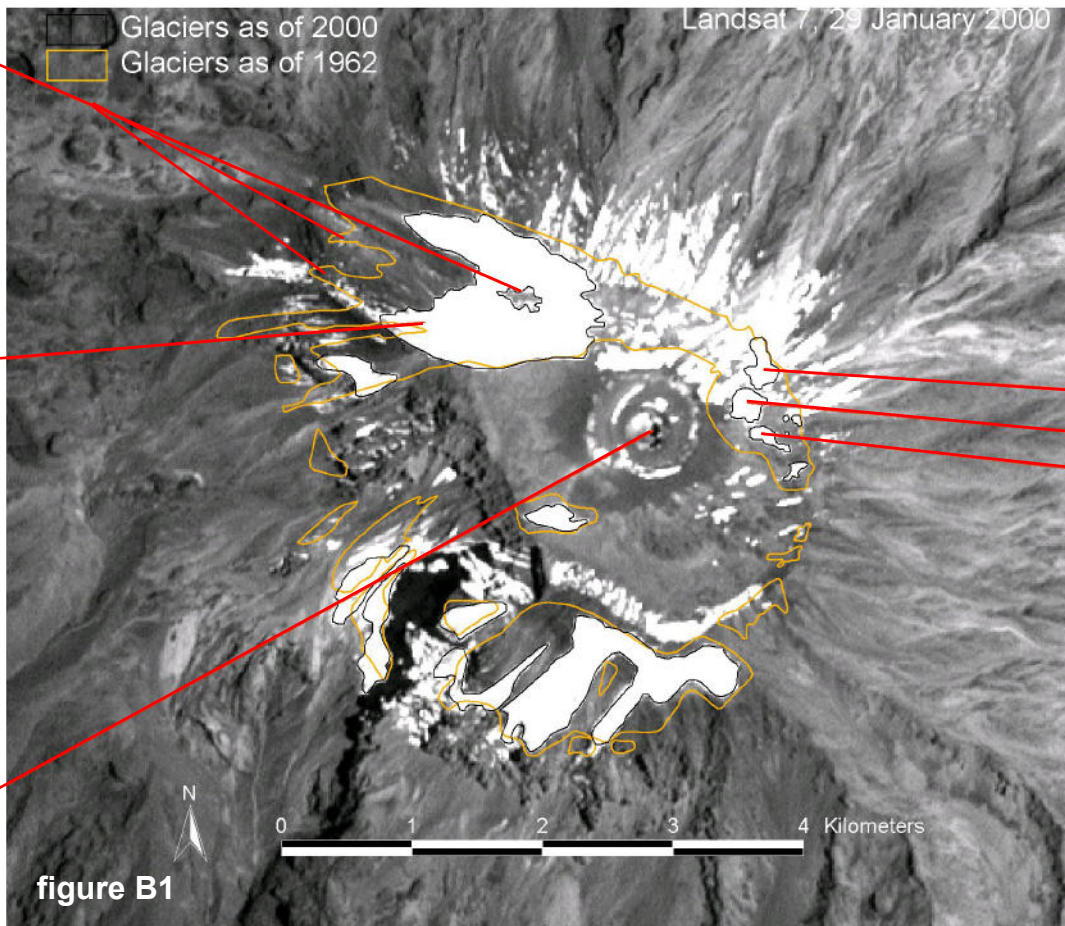
Furtwangler Northern Icefield Eastern Icefield

Appendix B - Landsat Image Showing Glacial Recession on Kibo from 1962 to 2000

West of the Northern Icefield the Drygalski Glacier has receded entirely with only a remnant of the Great Penck still remaining

The Pengalski and Great Penck Glaciers have receded to their root, merging indistinctly into the remaining mass of the Northern Icefield's south west edge

The Reusch Crater



“Over these 38 years, Kilimanjaro has lost some 55 per cent of its glaciers.”

United Nations Environment Programme

“Kilimanjaro has lost 82 percent of the ice cap it had when it was first carefully surveyed in 1912.”

Byrd Polar Research Center of Ohio State University



Appendix C - Kilimanjaro Glacial Surveillance Route

Route Start Point, Mlima Nyuki, 1771m

