

Northern Mozambique's 'sky islands' contain different microclimates to the surrounding lowlands

Islands in the Sky

The biological wonders of Mozambique's mountains have only recently been unveiled after years of neglect. Secrets still exist, however, as Sam Jones discovered when launching a biological assault on the Njesi Plateau

**PHOTOGRAPHS
BY MAC STONE**

Over the past two and a half years I've looked at this view countless times, yet this is the first time I've really seen it. Google Earth didn't prepare me for this – a near 360-degree panorama of what feels like the rooftop of Africa. Plunging away to my west is a huge escarpment, isolating the mountaintop from the miombo woodlands some 500 metres below.

My eyes pick over the waves of this unbroken canopy into the distance, where, somewhere beyond the burnished orange horizon of the setting sun, is Lake Malawi. Shifting my gaze southwards, I trace the ridgeline, following a series of peaks topped with patches of dark green forest until losing it to the horizon.

From the forest to the east of the summit I can hear the wailing calls of trumpeter hornbills, coughs of blue monkeys and the distant whinnying display of a crowned eagle. This is their home – an isolated block of evergreen forest surrounded by a sea of lowland woodland. More specifically, this is Mt Sanga, a classic 'sky-island' in northern Mozambique that has never seen the feet of biologists, until now.

Until ten years ago, biological knowledge of the mountains of northern Mozambique remained sparse – footnotes in occasional species distribution maps. The geographical remoteness of the region, coupled with decades of civil unrest that rendered large parts of the country inaccessible meant almost no biological work was conducted here since a scattering of early colonial explorations. This all changed, however, when a scientist found a mountain covered in rainforest via satellite imagery for which no name existed.

THE FORGOTTEN 'SKY-ISLANDS'

Studding the vast landmass of northern Mozambique, broadly north of the Zambezi river, are a series of montane archipelagos disjunct from the highlands of Tanzania to the north, and Malawi, Zambia and Zimbabwe to the west. Because of their height, these mountains harbour different microclimates to the surrounding lowlands, where lush 'Afro-montane' rainforests flourish, supporting a completely different fauna and flora to the widespread lowland miombo (*Brachystegia*) woodlands common throughout eastern Africa. Colloquially known as 'sky-islands', such mountains are

EXPLORE NJESI PLATEAU

sufficiently isolated from one another that they form islands of endemism with species occurring on them that exist nowhere else. While the phenomenal biological diversity of the highlands of eastern Africa (such as Tanzania's Eastern Arc Mountains) has been relatively well documented, the opposite can be said of Mozambique's mountains.

One of the first biologists to report findings from explorations in northern Mozambique was an ornithologist, Jack Vincent. Presenting his findings from the Namuli Mountains to the RGS in 1933, he astutely summarised in his opening salvo:

'In Africa, we find a number of features such as mountains and escarpments which split up many species of birds into quite distinct races; prominent examples of this are seen in the Muchinga escarpment of Northern Rhodesia, west of the Luangwa Valley, and in the "island" mountains of northern Tanganyika. In East Africa we have had in Tanganyika Territory bird forms varying widely from others farther south, and, for many years, the Zambezi River has been accepted as an adequate demarcation. But it has been long evident that something more accurate was wanted and that it was to be sought for in Mozambique.'

Beyond birds, Vincent's preamble was true for all species and remained the case for more than 70 years. This was all until the remarkable discovery of Mount Mabou was made, turning the attention of biologists and international media to Mozambique's mountains.

While researching potential study sites via satellite imagery for a project on southeastern Africa's montane ecosystems, Dr Julian Bayliss discovered a vast area of montane rainforest for which no record existed.

Unknown to the world outside of a handful of local communities, we now know Mount Mabou to be the largest montane rainforest in southern Africa. Affectionately dubbed the 'Google forest' owing to its discovery via Google Earth satellite imagery, this landmark discovery put the biological importance of Mozambique's mountains firmly onto the map, revealing their secrets after decades of neglect.

The discovery of Mount Mabou catalysed a series of biological expeditions across mountains in north-central Mozambique. These field campaigns yielded a large number of species new to science, as well as threatened species with highly restricted ranges in better-studied mountains in the region. Collectively, these findings prompted two timely questions – how distinct are Mozambique's mountains from other similar highlands to the north and west, and what other biological discoveries remain on other poorly explored highlands in the region?

With these in mind, while poring over topographic maps and published papers, my colleague Dr Merlijn Jocque and I converged on a key piece of the biodiversity puzzle of Mozambique's mountains – the Njesi Plateau.



BIODIVERSITY INVENTORY FOR CONSERVATION (BINCO)

Contrary to popular opinion, the world's species and wild places are often still very poorly known. Specifically aiming to address these knowledge gaps, BINCO (www.BINCO.eu) is a Belgian-based, but internationally engaged, non-profit organisation. Founded by five Belgian biologists in 2008, BINCO specialises in biodiversity assessments and monitoring, focussing on poorly studied regions and species. It employs a 'boots on the ground' approach aimed at compiling crucial biological knowledge through targeted field research to help conservation NGOs, governments and others make informed decisions to protect natural capital.

In particular, BINCO is a platform for young researchers to develop their own biodiversity projects under the guidance of more experienced scientists. Key points in BINCO projects include: 1) standardised biodiversity assessment and monitoring; 2) free and unhindered availability of biodiversity data; 3) capacity building (of young people undertaking a BINCO project in-country scientists) in developing robust biodiversity surveys and taxonomic expertise; and 4) awareness raising to relevant stakeholders on the importance of biodiversity. BINCO has successfully undertaken projects in over ten countries, particularly in the tropics. The Njesi Plateau expedition was BINCO's first foray into Mozambique, but is unlikely to be its last!

restricted to small forest patches here on the Njesi Plateau.

Situated in Mozambique's remote Niassa province, the Njesi Plateau is the largest highland in the northwest of the country, forming an obvious 'stepping stone' north into Tanzania.

While few scientists have ever been here, the extremely rare long-billed tailorbird was discovered here in 1945. Working at the behest of influential ornithologist Con Benson, Zambian collector Jali Makawa discovered the tailorbirds here, some 900km away from the only other known population in northern Tanzania.

Recent work has suggested these two populations are entirely different species and that the Tanzanian population numbers fewer than 200 individuals. Irrespective of the resolution of their status as a separate species, the tailorbird perfectly exemplifies the importance of these Afromontane refugia; small pockets of habitat where priceless biological gems exist.

We sought to fill this knowledge gap through a large multi-disciplinary expedition. Specifically, while the southerly extent of the plateau had been visited on a handful of occasions by biologists, the two northerly peaks of Mount Chitagal and Mount Sanga had never been biologically surveyed.

After two and half years of planning, we embarked with a conceptually simple aim – to compile as comprehensive a picture of the biodiversity of the

THE EXPEDITION

'It's getting closer,' my fellow ornithologist Gabriel Jamie whispers excitedly, our combined attention possessed by a shape flitting in and out of view through a tangle of vines that conceal our position. Flicking between

perches, the squeaky calls continue until we lose sight of it. The sound goes silent. Craning our necks in nervous anticipation we stretch for a better view. The net wriggles, confirming our suspicions, and we burst forward to extract the captive. Weighing scarcely

more than a 2p coin, this slate-grey ball of feathers with a goofy oversized tail and rusty orange head has captivated our minds for months. This bird, the 'Mozambican' long-billed tailorbird, has been seen by only three ornithologists before, its entire global distribution

EXPEDITION KIT



Notebook Moleskine • £11.99

Moleskine notebooks keep your notes in one place: be it maps, species lists, or general thoughts. A well-kept directory that doesn't require batteries is critical and provides a handy memento of your work for years after.

Navigation

Garmin GPSMap 62s • £210

A good GPS is essential for remote fieldwork. Higher-end Garmins are rugged with a good battery life. They keep you on point when mapping your route or finding your way to already mapped coordinates.



Boots

Meindl Bhutans • £210

Remote overland expeditions are always tough on your feet and tough terrain needs tough boots. Meindl Bhutans are more than a match with great comfort, ankle support and will keep your feet dry in wet conditions.



Torch

LED Lenser H7R.2 • £87.95

A good and reliable head torch is another essential for remote fieldwork. This model provides great value for money and lights all end of the spectrum from a powerful spotlight to low-power modes.



Nets

Ecotone six-metre mist-nets • £41.99

Ornithologists familiar with tropical forests will know the challenges in setting long nets in thick forest understoreys. Six-metre nets are the ideal length, providing functionality with ease of manoeuvre.



Clipboard

Paperdry Waterproof • £23.99

A tidy inside compartment to keep data sheets dry as well as an external side to use for drier conditions.



Binoculars

Swarovski EL10x42 • £1,940

Swarovski ELs are almost unmatched when it comes to quality of high-grade optics. Painfully expensive, but a near once-in-a-lifetime expenditure – built to perform for years with phenomenal optical quality.

Audio

Sennheiser ME66 microphone/Olympus LS-11 recorder • £169/£178 (used)

Sound recording and archiving of birdsong is key for good ornithological surveys providing both records of undocumented song and 'vouchers' of important records. This combo is one of the best in the business for targeted recording.



Knife

Puma IP El Dedo • £56

Excellent quality blades and built to last for years – a good knife is an essential piece of kit for remote fieldwork.



Clothes line

Lifeventure travel • £6

A way of drying and airing clothes is an often overlooked but extremely useful thing in remote field camps. Packs down into a minute parcel and with a nifty intertwined elastic loop design, your clothes will never come off.

plateau as possible within the logistical constraints. The challenges of fieldwork in the region are not trivial; no maps of usable scale exist, only regional roads skirt the area, no trails, local taboos to contend with and no definitive information on water sources.

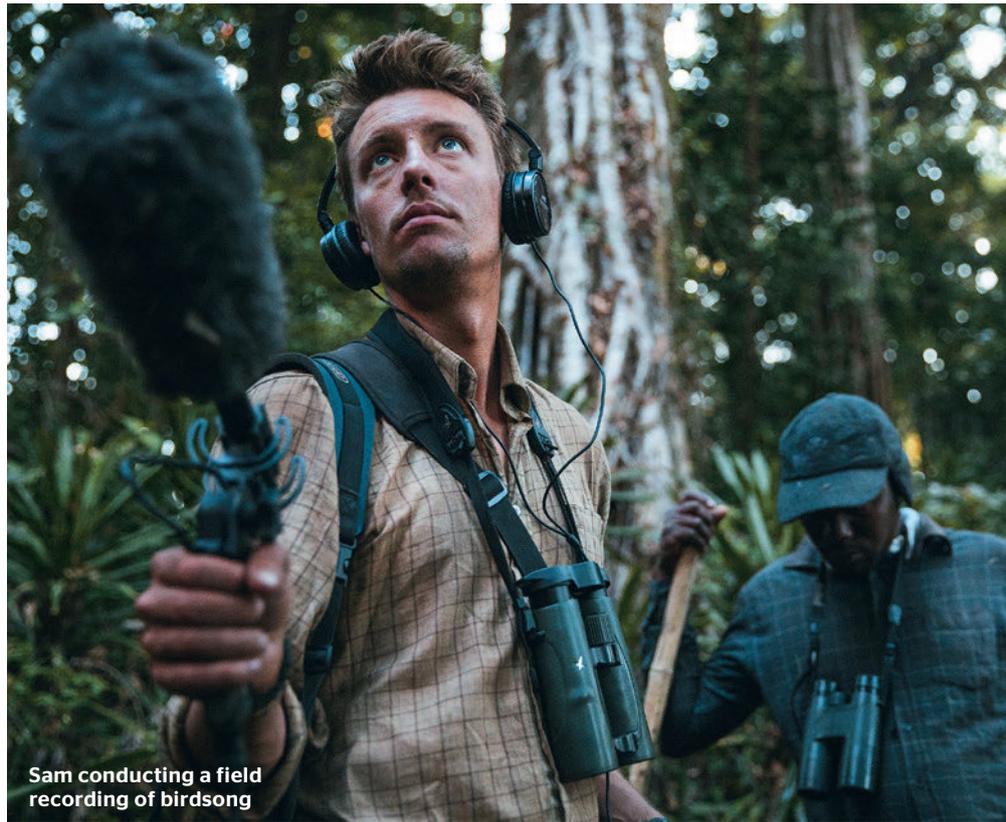
This came in concert with the further logistical challenges of surveying the three highest peaks on the plateau with a team of eight scientists, two media professionals, three guides, a forest guard and a further 25 porters to help us transport 500kg of equipment up and down between each peak in three mini-expeditions. Our team covered specialisms, from birds to botany – an ecological swat team designed to rapidly record and catalogue species in remote field conditions.

Because our team covered a range of disciplines, work was undertaken around the clock – from dawn point count surveys for birds to late-night light trapping for moths – from a mobile field station set up to be run from remote forest camps. Our expedition was timed to specifically coincide with the start of the rainy season, and although no rain came, discoveries did.

We extended the known distributions of countless species across taxonomic groups, at times on an almost daily basis. We found the presence of rare and threatened species such as the dapplethroat – an inconspicuous forest robin known from only a handful of isolated mountains in eastern Africa – and little-known mammals such as the Mozambique dwarf galago, significantly extending the known range of this nocturnal primate.

Similarly, our team found records of species not observed since their first discovery, such as the mecala girdled lizard. Additionally, while we await the results of genetic work, it is likely that several small rodents and amphibians may prove to be new species to science. Some of these are resolved, however, such as the wolf spiders, of which seven (of 37 species identified) are new to science, and now await formal description. Not least, we also found long-billed tailorbirds in virtually all suitable habitats, allowing us to collect critical new information on their population size and genetics.

While the extension of the known range of a single species may appear of relatively nominal value, the broader narrative of their collective presence is more powerful – that presumed lack of presence in poorly studied regions



Sam conducting a field recording of birdsong

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is largely an artefact of lack of study. While it remains too early to conclude, the biological assemblages recorded from Njesi appear to be more related to mountains further north than to the south, indicating Mozambique's north-central mountains in the region of Mount Mabu probably form their own unique biogeographic cluster.

Further, two of the three summits on the Njesi plateau were largely undisturbed by humans and it was evident they were sufficiently remote for their habitats to remain pristine. Our findings have also been fed directly into protected area designations through the Key Biodiversity Area analysis.

Fuelled by many of the same motivations of discovery and adventure as Victorian expeditions, modern biological expeditions necessarily take on a slightly different guise. An unsung, but essential component of any such campaign is capacity building and we formed a strong link with both the Maputo Natural History Museum and the Rift Valley Corporation in Niassa, sponsoring local scientists and working with local logistical expertise. The former is particularly important in a country like Mozambique, where the biologists and conservationists of the future lack the opportunities available to the young aspiring scientists of the West.

While biological explorations and discoveries may seem a world apart from the modern day, Mozambique's mountains prove that untouched corners of the planet still exist. Therein, new discoveries lie in wait, giving away their mysteries to those who dare to look. ●

■ Sam Jones is an ornithologist currently undertaking his PhD at Royal Holloway studying the behavioural and physiological ecology of tropical forest songbirds. Sam has worked widely throughout the tropics undertaking work on some of the world's rarest birds and on biological assessment expeditions.