

Vultures and sky burials on the Qinghai-Tibet Plateau

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Introduction

In the Tibet Autonomous Region, the tradition and custom of sky burial is known as *jhator* meaning "giving alms to the birds" (Van Dooren 2011), and vultures are an important part of these funerals. In places where there are several *jhator* offerings each day, the birds sometimes must be coaxed to eat, which may be accomplished with a ritual dance. It is considered a bad

omen if the vultures will not eat or if even a small portion of the body remains after the birds fly away.

The practice of *jhator* remains mysterious, however, and it is not well understood. For example, most people think the main species involved with *jhator* is the Cinereous Vulture *Aegypius monachus* (Anon. 2005), but according to our recent investigations, Cinereous Vultures

and Bearded Vultures *Gypaetus barbatus* seldom appear at the sky burial platform. Instead, the Himalayan Vulture *Gyps himalayensis* is the most common participant at sky burials. Given the threats to Asian vultures, it is important to know more about this traditional practice and any effects on vulture conservation.

Distribution and population

Sky burial is a traditional funeral of the Mongolian and Tibetan ethnic minorities, and it has a long history over thousands of years in China (MaMing *et al.* 2016). Other ethnic minorities also keep the custom in Qinghai, Tibet, Gansu, Sichuan, Yunnan, Xinjiang and Inner Mongolia. In the past, sky burials were limited to high lamas and other dignitaries, arguably due to the relative absence of timber resources for cremation in the barren, rocky and ice-covered Himalayas, and

corpses were offered to vultures after religious ceremonies (Martin 1996). Now, sky burials have been increasingly used by commoners.

Recently, the Raptor Team of the China Ornithological Society in the Yushu Tibetan Autonomous Prefecture, Qinghai Province, investigated the relationship between vultures and the custom of sky burials. We found that sky burials are held in the morning from 08h00 to 11h00 (Beijing time) and we observed more than 240 Himalayan Vultures consuming bodies (n=3) over 2.5 hours. The hair is removed from the head and is burned along with some of the debris; big bones are broken by sky burial masters (Figure 1). The bodies disappeared in less than 40 minutes. Then, as if the sky burial had never happened, all returns to peace and calm on the hill. Tibetans believe that at this point, life has completely left the body and the body contains nothing more than simple flesh.



Figure 1: Big bones are broken for vultures by the sky burial master. A sky burial site in Qinghai (Photo by MaMing)

A similar situation has been recorded in southern Tibet at the Drigung Thel Monastery (Liu *et al.* 2013), where vultures occupy alpine meadows in the day and roost on the upper cliffs at night, between elevations of 4200-5000m. The number of Himalayan Vultures around the monastery was estimated at 230 in 2003, 250 in 2009 and 200 in 2012 (Lui *et al.* 2013) This population is relatively stable, most probably due to protection of the birds by Buddhist

monks and local people.

A snack or main food?

In a temple of Ruoergai County, Sichuan Province, some vulture specimens were enshrined and hanging from the wall (Figure 2). Whilst it can be difficult for people to understand the Tibetan reverence for vultures (Zhang 2001), our aim was to determine how much of the vultures' diet comes from sky

burials; are they a ‘snack’ or do they provide a major source of food for vultures? We estimated that a vulture eats 200-300 grams of meat or offal during a sky burial. However, given that the vultures stayed at the sky burial site for a long time afterwards and appeared reluctant to leave, it is

possible they may not have enough food. Given the number of sky burials, it seems unlikely that human corpses provide only 2% of the amount of food in the Tibetan plateau, as has been suggested elsewhere (Lu *et al.* 2009).



Figure 2: In Ruergai County, Sichuan Province, vultures samples were suspended in the Daza Temple (photo by MaMing)

To better understand the relationship between the Tibetan population and sky burials, there are 6.28 million Tibetan people (National Bureau of Statistics 2010). If 80% of these

people choose a sky burial, at a human mortality rate of 7-9%, there would potentially be a large number of corpses available to vultures. According to public data (Xinhua

2013), a total of 2000 sky burial sites were distributed over the Tibetan plateau receiving 50,000 corpses per year; this could feed approximately 20,000 vultures. It is therefore possible that sky burials contributed almost 20% of the total food for Tibetan vultures, which is a far higher proportion than the 2% suggested by Lu *et al.* (2009).

There is some connection between the number of corpses and the number of vultures (Table 1). In July 2016, we observed and visited for five days in Yushu, where we found that the number of vultures was related to the number of corpses, with many vultures clustering around

the burial station. When there are more funeral corpses, there are more vultures. We recorded many aspects of the sky burial with pictures in Tibet, Sichuan and Qinghai (see Appendix figures), such as fighting, dancing, tug of war, sunbathing, etc. There were also wild dogs and Tibetan mastiffs present, which ate the bones at a site (Figure 3). For Tibetan Buddhists, sky burial is the template of instructional teaching on the impermanence of life, the resolution of grief in the survivors is intertwined with the journey to rebirth of the deceased (Goss and Klass 1997).



Figure 3: Wild dog with an arm from a sky burial in Qinghai (Photo by Lee)

Table 1: Observation records of sky burials with vulture numbers in Yushu Tibetan Autonomous Prefecture

Date	Burial time	Number of corpses	Vulture number	Comments
14 July	8:00-11:00	3 (c. 120kg)	240	
15 July	9:00-10:00	1 (c. 40kg)	60+	Visit 4 sky burial masters
16 July		0	0	The sky burial station was empty
17 July		0	0	No vultures seen on the mountain
18 July	8:30-11:00	2+ (c. 80kg)	130+	

Migration information from movebank

From 2014 to 2016, 23 vultures were

captured in the Himalayas of Bhutan, and were equipped with GSM/GPS transmitters by locals with experts of the Max Planck Institute for

Ornithology and University of Konstanz, Germany (Sherub *et al.* 2016). The tracking data are stored at the Movebank site (<https://www.movebank.org>) and have provided the first understanding of the movements for the Himalayan Vulture (Sherub *et al.* 2016). The main areas of activity for the tracked birds were in China's Qinghai-Tibet Plateau, Yunnan-Guizhou Plateau and Mongolia-Xinjiang Plateau. There appears to be a preference to congregate at garbage dumps (Figure 4), sky burial stations and slaughter houses. However, when we asked four local Lamas including some sky burial masters, they had not seen any GPS transmitters on the backs of vultures.



Figure 4: Vultures at a rubbish dump near a suburban area, Tibet (Photo by MaMing)

Additional data from the tagged birds have revealed that they were over-wintering from India to Nepal and Bhutan, and some in southern parts of China (Yunnan and Tibet). Tagged birds spent summers in Mongolia and China (Qinghai, Xinjiang, Gansu, Sichuan, Inner Mongolia and Tibet). The Himalayan Vultures migrated to the summer grounds in May or June and fall migration occurred in October and November. There were two remarkable findings: First, the

migration speed and distance. The Himalayan Vultures flew a mean distance of about 85 km per day and an annual cumulative flight distance of approximately 30,000 km! Secondly, there was very high mortality recorded (> 30% with a GSM/GPS tag died in the first year).

Conservation and regulation

At a sky burial station with a stupa in the background (Figure 5), we saw three sky burial platforms on the hillside. Next to the slopes the valley was full of prayer flags and Mani stones, crushed bones scattered over the grassland, sparrows, red-billed choughs, magpies, ravens, hill

pigeons and other species that were cleaning up leftover food. Such generosity and compassion for all beings are important virtues in Buddhism. At the great sky burial sites near Yushu and Sertar, Qinghai and Sichuan Provinces, the Tibetan people have built some temples and towers of death to attract and entertain the growing numbers of Chinese tourists who visit to see the vultures. It seems very surprising that sky burials are becoming an attraction for tourists, but there is no taboo (such as a ban in Tibet), which turns this simple and practical ritual into a tourist attraction in Qinghai and Sichuan.



Figure 5: A sky burial station in Qinghai (Photo by MaMing)

Tibetan Buddhism plays an important role in the conservation of Himalayan Vultures and other wildlife in the Qinghai-Tibet Plateau (Martin 1996, Satheesan 1998, Campbell 2015). More than 80% of the 6.28 million Tibetans are intended for eventual consumption by Himalayan Vultures in celestial burials (MaMing *et al.* 2015). At one sky burial site, we were told by local people that about 100 vultures were found dead after feeding on a human carcass (Jin and Yu 2004) and, even if the local people rarely treat livestock with veterinary drugs in Tibet (Lu *et al.* 2009), raptors face

threats other than poisoning in China (MaMing *et al.* 2014).

Recently, the local government passed regulations to protect Tibetan tradition and culture. The regulations prohibit human activities such as firing, blasting and quarrying around the burial sites to avoid disturbance to the scavengers. Also, the regulations do not allow sky burial for people who have died of toxicosis or infectious diseases, in an attempt to prevent poisoning of vultures. The state has recently changed its attitude toward sky burials and begun to invest heavily in the renovation of the sky burial

stations from 2013 to 2016. Therefore, the Himalayan Vulture, a hallowed and important bird for local people and the plateau, enjoys considerable protection from several sources. We think the funeral history is an important part of Chinese history and, in the book 'Vultures in Xinjiang' (MaMing *et al.* 2016), we describe the story of the burial origins in relation to vulture life history.

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Appendix 1: Photos of a sky burial and Himalayan Vultures



Figure A1: A sky burial with attending vultures in Qinghai (photo by MaMing)



Figure A2: The vultures feeding at a sky burial site in Qinghai (Photo by MaMing)



Figure A3: More than 240 vultures can finish three bodies in 2.5 hours at a sky burial site in Qinghai (Photo by MaMing)



Figure A4: Lamas performing a dance like vultures (by MaMing in Qinghai)



Figure A5: Vultures run to feed upon the final body parts at a sky burial in Qinghai (Photo by MaMing)



Figure A6: Vultures feeding at a sky burial site in Qinghai (Photo by MaMing)
