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13th History Symposium

Meteorological Aspects of the First Flight Over Everest

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Aerosols, Climate, and the Hydrological Cycle, V. Ramanathan,P. J. Crutzen, J. T. Kiehl, D. Rosenfeld
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Supplemental Figure 1. Photograph of the South Asian brown haze over the Nepalese town of Phaplu (bottom panel), taken on 25 March 2001, approximately 30 km south of Mt. Everest (top panel), from a flight altitude of about 3 km. Both photographs were taken from the same location, one viewing north (top) and the other (bottom) south. During the dry season from January to April the brown sky seen over Nepal is typical of many areas in South Asia. The dry, north-east monsoonal winds carry this anthropogenic haze thousands of kilometers south and south eastward and spread it over most of the tropical Indian ocean between 25°N to about 5°S (see Figs. 1 and 2A).

Haze in the Indo-Gangetic Plains

Analysis of Multi-angle Imaging SpectroRadiometer (MISR) aerosol optical depths over greater India during winter 2001–2004

L. Di Girolamo,[1] T. C. Bond,[2] D. Bramer,[1] D. J. Diner,[3] F. Fettinger,[1] R. A. Kahn,[3] J. V. Martonchik,[3] M. V. Ramana,[4] V. Ramanathan,[4] and P. J. Rasch[5]

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Figure 3 with the topography shown in Figure 4 reveals this correlation between AOD and altitude, which gives further confidence in the MISR AOD product. This correlation alone, however, is not enough to explain the full spatial distribution of AODs in Figure 3; to do so requires topographical, meteorological, and source considerations to be examined in unison. Although there is insufficient space in this letter to discuss all the spatial details in Figure 3, the data and arguments used to discuss several noteworthy regions below can be applied to other regions.

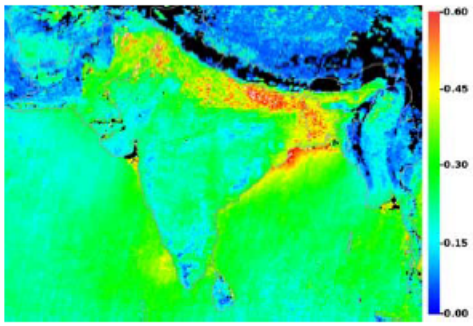


Figure 3. MISR 558 nm AOD averaged over winter (DJF) for 2001 to 2004. Black represents regions where the MISR aerosol algorithm failed to produce any AOD retrieval, due to topographic complexity, persistent cloud, or murky waters. White represent regions of AOD > 0.6.

[11] The most striking feature in Figure 3 is the high AODs in the Indo-Gangetic valley. AODs are especially high in the eastern part of this valley, largely within the Indian state of Bihar; hence we will refer to it as "the Bihar pollution pool." To explain these high AOD values, we note the high (largely rural) population density shown in Figure 1. In India, high population density is often associ-

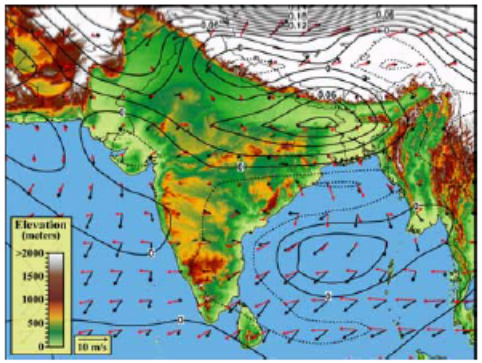
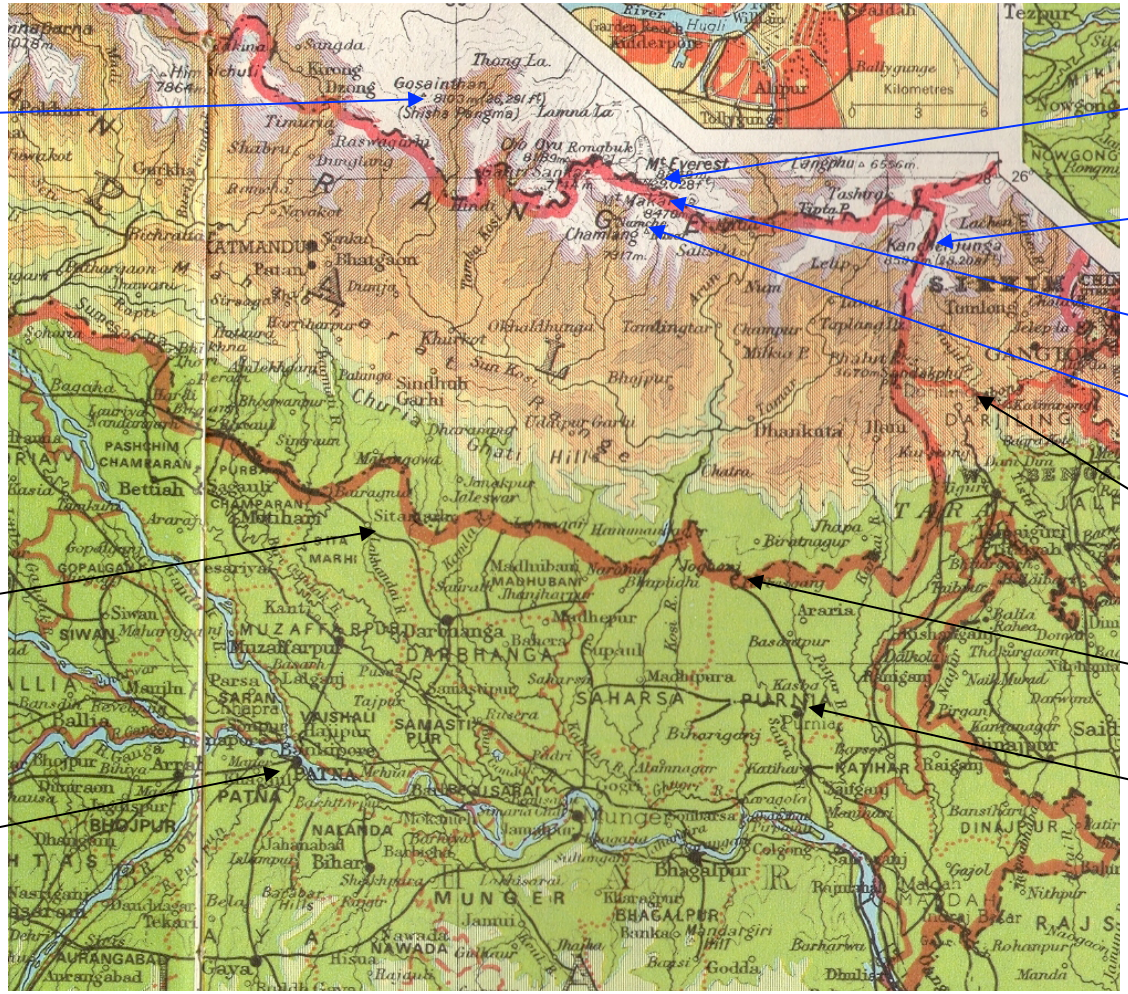


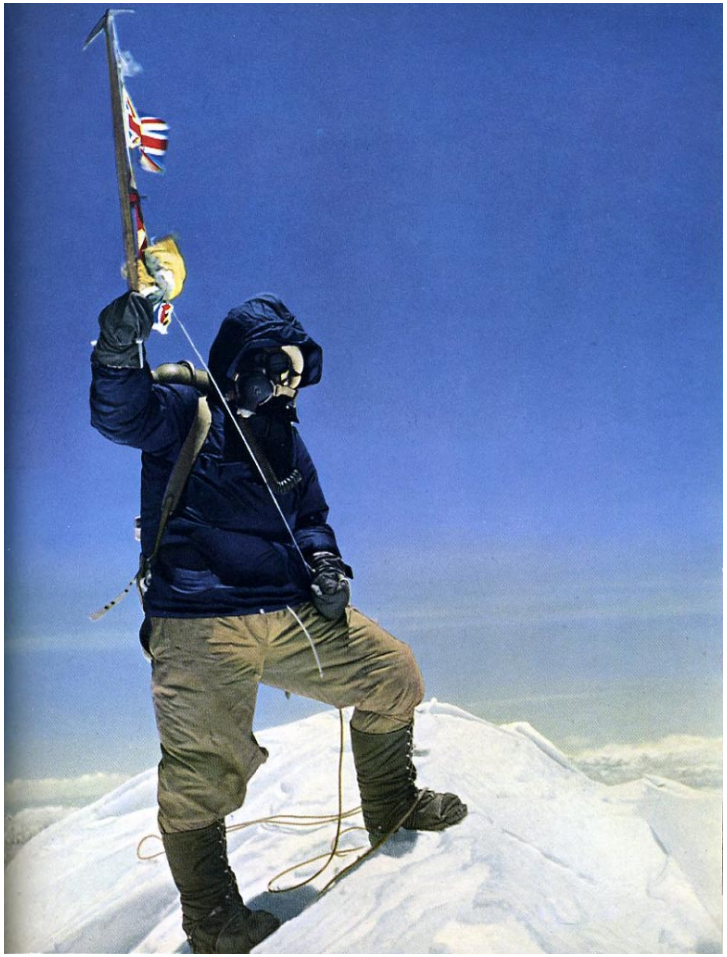
Figure 4. NCEP reanalysis fields overlaying an elevation map of greater India. Black arrows represent surface winds, red arrows represent 850 mb winds, and contour lines represent vertical velocity, where the solid lines represents subsidence and the dashed lines represent ascent. Contour spacing for vertical velocity is 0.02 Pa/s.

Flight Over Everest



Conquest of Everest

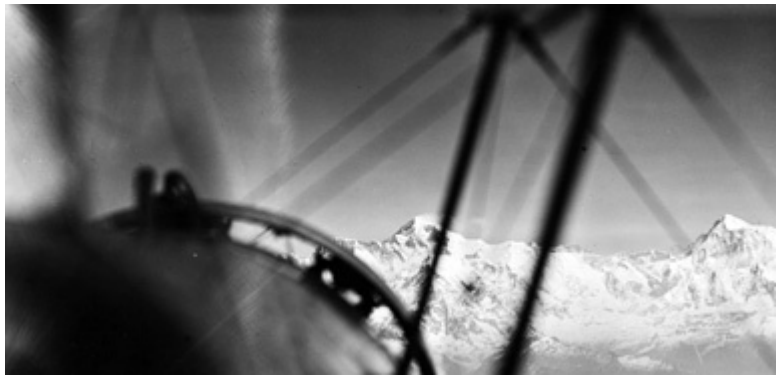
29 May 1953



- Hillary took the famous photo of Tenzing posing with his ice-axe, but since Tenzing had never used a camera, Hillary's ascent went unrecorded.
- All the photos of the mountaineers on the top show only Tenzing. When asked why there were no photos featuring Hillary, Sir Edmund replied, "Tenzing did not know how to operate the camera and the top of Everest was no place to start teaching him how to use it."

Conquest of Everest by Air

3 April 1933



EVEREST CONQUERED FROM THE AIR: Houston Expedition's Flight TWO ...
OUR SPECIAL CORRESPONDENT
The Manchester Guardian (1901-1959); Apr 4, 1933;
ProQuest Historical Newspapers: The Guardian (1821-2003) and The Observer (1791-2003)
pg. 9

EVEREST CONQUERED FROM THE AIR

Houston Expedition's Flight

TWO 'PLANES CIRCLE 100 FEET ABOVE SUMMIT

A Mishap to the Photographer

(FROM OUR SPECIAL CORRESPONDENT.)

PURNEA (BIHAR), APRIL 3.

The summit of Everest was flown over to-day by both machines of the Houston Everest Expedition. The following official report has been drawn up by Squadron Leader Lord Clydesdale:—

"This morning (April 3) the Indian meteorological officer at Purnea, Mr. S. N. Gupta, whose information and advice has been of very great value to the expedition, reported from balloon observations that the wind, which previously had been unsuitable, had dropped to a velocity of 57 m.p.h. at 33,000 feet, which altitude we had decided would be the most suitable working height for a photographic survey. Our two machines took off at 8 25 from Lalbalu Aerodrome in still air. The Houston-Westland 'plane contained Colonel Blacker and myself, and the Westland-Wallace, piloted by Flight Lieutenant McIntyre, with Mr. S. R. Bonnett, who is the aerial photographer, as observer.

First over Everest! The Houston-Mount Everest Expedition, 1933

By P. F. M. Fellowes, L. V. Stewart Blacker, John Buchan, Houston Mount Everest Expedition
268 pages

Read a preview now

Contributors: P. F. M. Fellowes; L. V. Stewart Blacker; John Buchan; Houston Mount Everest Expedition
Publisher: Robert M. McBride
Place of publication: New York
Publication year: 1934
Subjects: Aeronautics--Flights; Everest, Mount (China And Nepal)

"Our direct route to the summit meant flying on track 342 degrees. This necessitated changing the compass course at intervals more to the west on account of increased wind velocity with height according to our weather report. We had relied on overcoming to some extent the difficulty of accurate compass navigation caused by this frequent change of wind speed by the good landmarks near and along our track.

"A heavy dust haze rising to a considerable height almost completely obscured the ground from Forbesganj to the higher mountain ranges. This made aerial survey work impossible. We climbed slowly at low engine revolutions to a height of 10,000 feet. By this height the crews of both machines had tested their respective electrical heating sets, and McIntyre and I signalled to each other that everything was satisfactory. After 30 minutes' flying we passed over Forbesganj, our forward emergency landing ground forty miles from Purnea, and at a height of 19,000 feet Everest first became visible above the haze.

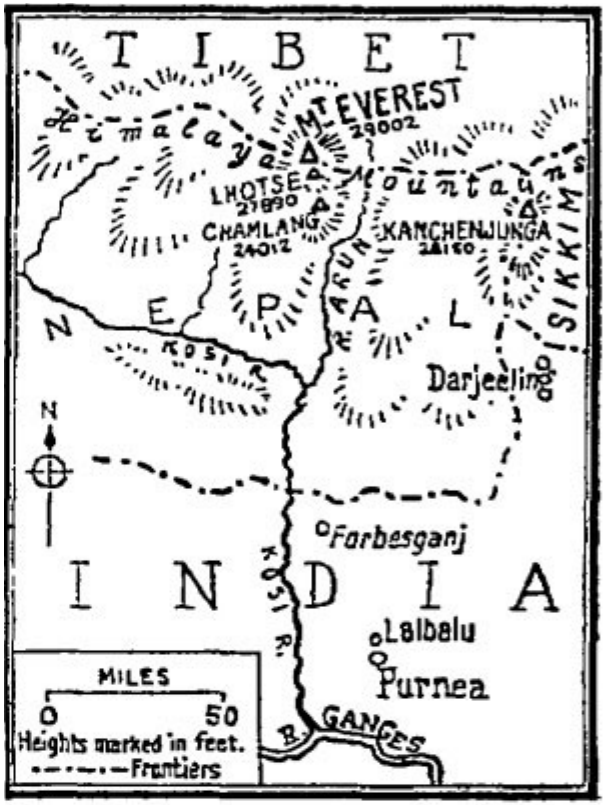
FLYING LOW

"We flew lower than our intended working height in order to make every endeavour to pass over Komaltar, close to which is the ground control from which we were to begin our survey. It proved impossible to identify any landmarks at all until approximately within twenty miles of the summit. At nine we passed over Chamlang at an altitude of 31,000 feet. On approaching Lhotse, the southern peak of the Everest group, the ground rises at a steep gradient and both machines experienced a steady down current due to the deflection of the west wind over the mountain, causing a loss of altitude of 1,500 feet despite all our efforts to climb.

"Both aeroplanes flew over the summit of Everest at 10 5, clearing it by a hundred feet. The wind velocity was noticeably high near the summit but no bumps were felt by either aircraft. Fifteen minutes were spent flying in the neighbourhood of the summit, and on account of the smooth flying conditions the taking of close-range photographs was rendered possible. Visibility of distant high peaks was very good. The great Himalaya range could be seen extending to great distances, and provided a magnificent spectacle.

Meteorological Aspects

- Of all the numerous scientific matters with which the expedition was concerned, it was apparent that meteorological and weather conditions would be of primary importance
- The outstanding meteorological factors at the outset were in the first place, the presence of clouds in the valleys and over the mountains, and secondly the force of the wind
- There was no regular observatory within eighty miles of the mountain, the nearest permanent one being that maintained for many years past by the Government of India at Darjeeling



Clouds and Haze

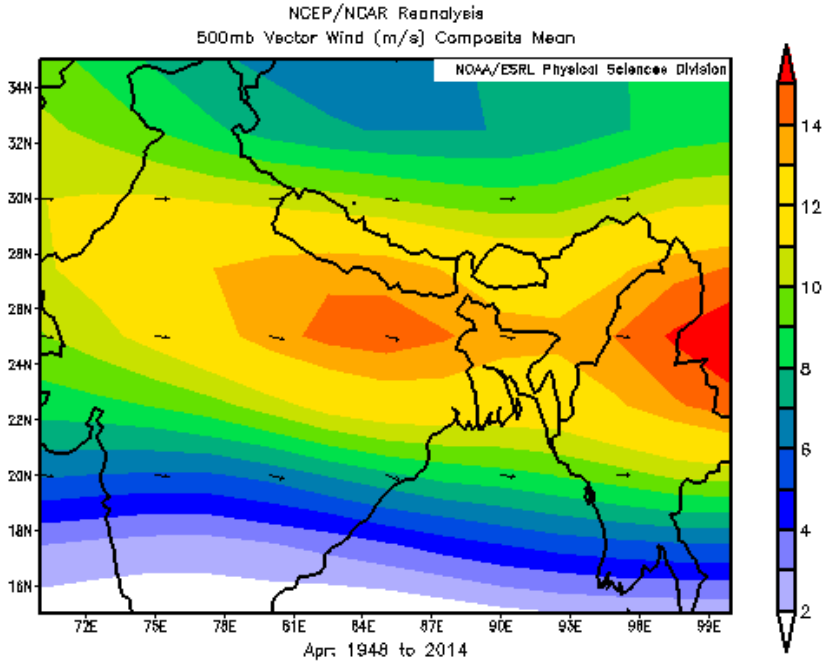
- Cloud conditions at Darjeeling, however, were by no means necessarily the same as those around Everest and Makalu – a hundred miles away, this being especially so owing to the Kanchen-junga group having a special affinity for attracting clouds to it
- The other observatory, in no way related to the mountain, was the minor government one at Purnea, our base, 160 miles distant, where again cloud conditions are totally different from those over Everest
- In autumn and spring the records show that the skies are nearly always clear at this latter station
- At the same time observers on the ground except in the autumn, were seldom able to see even the crest of the mountain owing to the thick dust-haze rising up from the plains

Wind

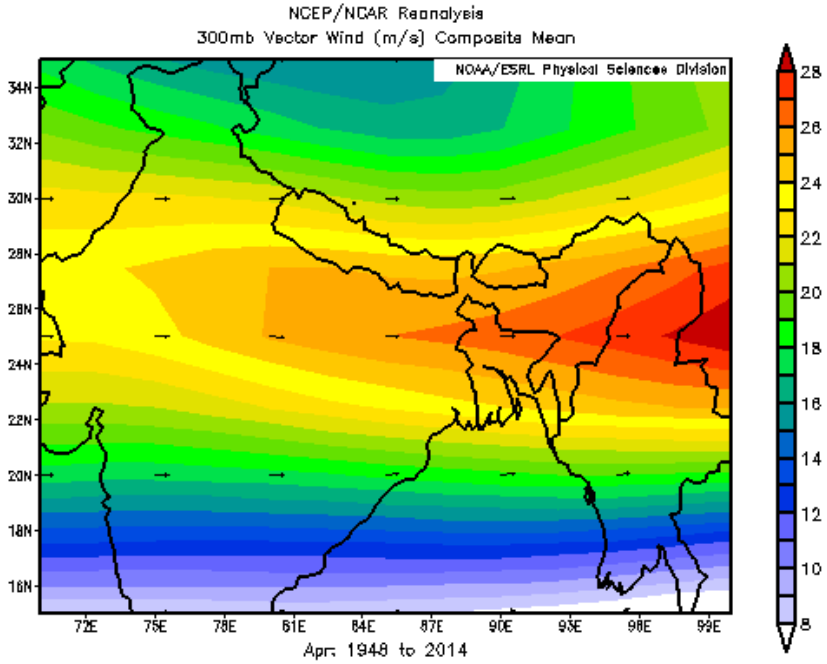
- There were special circumstances governing the wind
- The first was fuel consumption
- A wind from either beam has the effect of increasing the distance which an aeroplane must pass through the air in order to fly from point to point
- The result is that more flying has to be done than if there were no wind, the fuel consumption being proportionately increased
- Our calculations before leaving England were based on a wind speed of forty miles an hour throughout the flight, it being assumed that this would probably be from the west at right angles to the machine's course
- This figure was necessarily an arbitrary one…there had been no scientific observations of the wind velocities in the upper air in that region, and by upper air one means heights of 25000, 30000, 35000 and 40000 feet

Wind Climatology

500 mb



300 mb



40 mph = 17.9 m/s

Enter the Meteorologist

- We therefore communicated early with the Meteorological Department of the Government of India to enlist their invaluable assistance in the measurement of these wind speeds
- Dr. Norman (sic) afforded the expedition the most valuable help, detaching an expert meteorologist, Mr. S.N. Gupta, to form a special upper-air sounding station at Purnea
- The procedure involved the sending up of balloons twice daily, at 0630 hours and at 1430 hours; a similar procedure was carried out at Darjeeling
- The weather bureau at Calcutta telegraphed us at 21:30 hours, giving information of the general weather conditions along the Himalaya, and a forecast of what might be expected in the Mt. Everest region, especially as regards clouds and haze, and an estimate of the direction and velocity of the wind currents to be expected at various heights up to ten kilometers

Members of the Expedition

L/AC. Fraser, Clark, Cpl. Bradley
Read, Flt.-Sgt. Greenwood, Gupta, Hughes, Shepherd, Bennett, Hensley, Burnard, Pitt, Connachie, Sweeny, Young
Barkas, Etherton, Clydesdale, Fellowes, Blacker, McIntyre, Bonnett, Ellison, Fisher

THE MEMBERS OF THE EXPEDITION

The Flight - Departure

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The Flight – Over the Top

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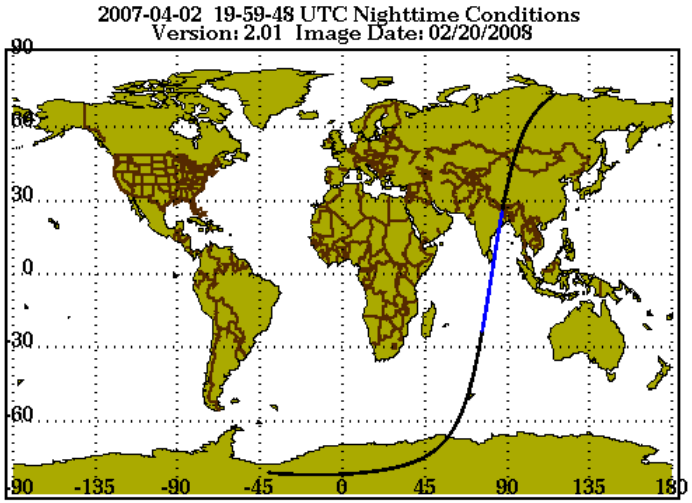
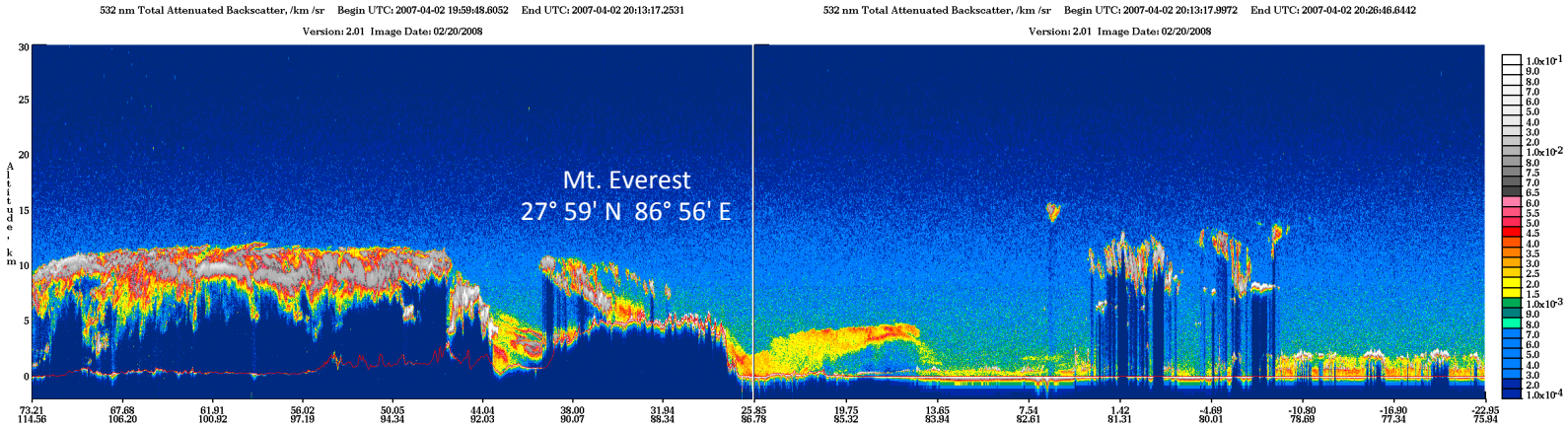
Return Journey

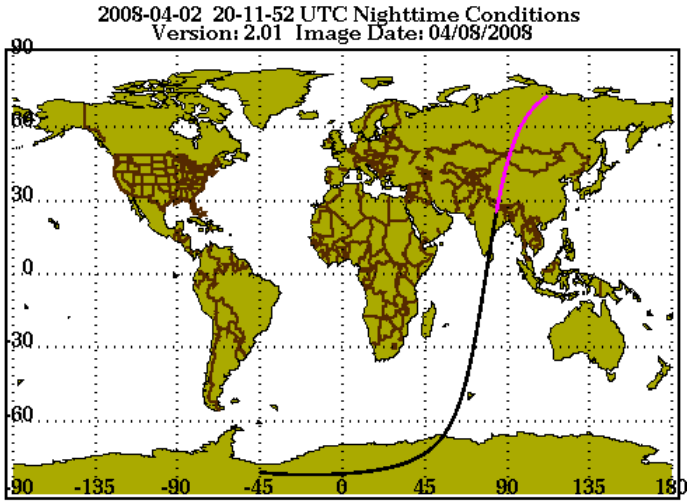
The return journey was carried out at a slightly lower altitude, so as to secure better conditions for oblique photography. Both machines landed at Lalbalu at 11.25. Both pilots pay the highest tributes to the splendid performance of the engines and aircraft. The flight over Everest today was carried out with no more fuss than an ordinary Service flight at home, and was completed in exactly three hours. The only mishap was a fracture to Mr. Bonnett's oxygen pipe over the mountain top, unnoticed until the cinematographer became faint with violent pains in the stomach. He had to sit down in the cock pit, and eventually noticed the fracture. He tied a handkerchief round the broken part, and soon recovered sufficiently to continue his photographic work.

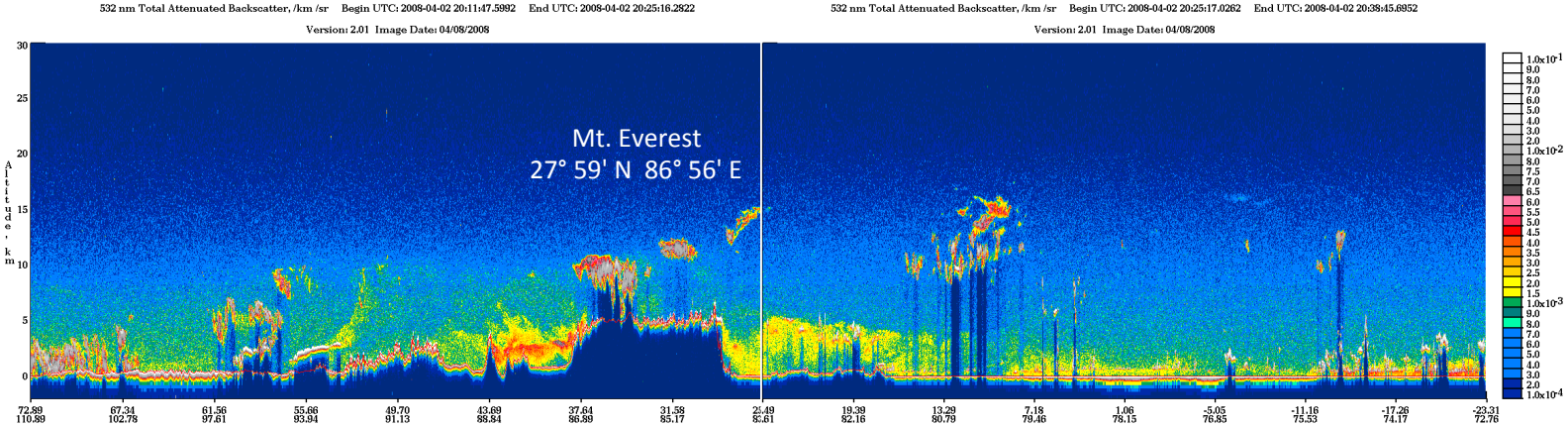
CALIPSO 2 April 2007





CALIPSO 2 April 2008





The trans-Himalayan flights of bar-headed geese (*Anser indicus*)

Lucy A. Hawkes[a], Sivananinthaperumal Balachandran[b], Nyambayar Batbayar[c], Patrick J. Butler[d], Peter B. Frappell[e], William K. Milsom[f], Natsagdorj Tseveenmyadag[c], Scott H. Newman[g], Graham R. Scott[f], Ponnusamy Sathiyaselvam[b], John Y. Takekawa[h], Martin Wikelski[i], and Charles M. Bishop[a,1]

9516–9519 | PNAS | June 7, 2011 | vol. 108 | no. 23

Birds that fly over mountain barriers must be capable of meeting the increased energetic cost of climbing in low-density air, even though less oxygen may be available to support their metabolism. This challenge is magnified by the reduction in maximum sustained climbing rates in large birds. Bar-headed geese (*Anser indicus*) make one of the highest and most iconic transmountain migrations in the world. We show that those populations of geese that winter at sea level in India are capable of passing over the Himalayas in 1 d, typically climbing between 4,000 and 6,000 m in 7–8 h. Surprisingly, these birds do not rely on the assistance of upslope tailwinds that usually occur during the day and can support minimum climb rates of 0.8–2.2 km·h^{-1}, even in the relative stillness of the night. They appear to strategically avoid higher speed winds during the afternoon, thus maximizing safety and control during flight. It would seem, therefore, that bar-headed geese are capable of sustained climbing flight over the passes of the Himalaya under their own aerobic power.

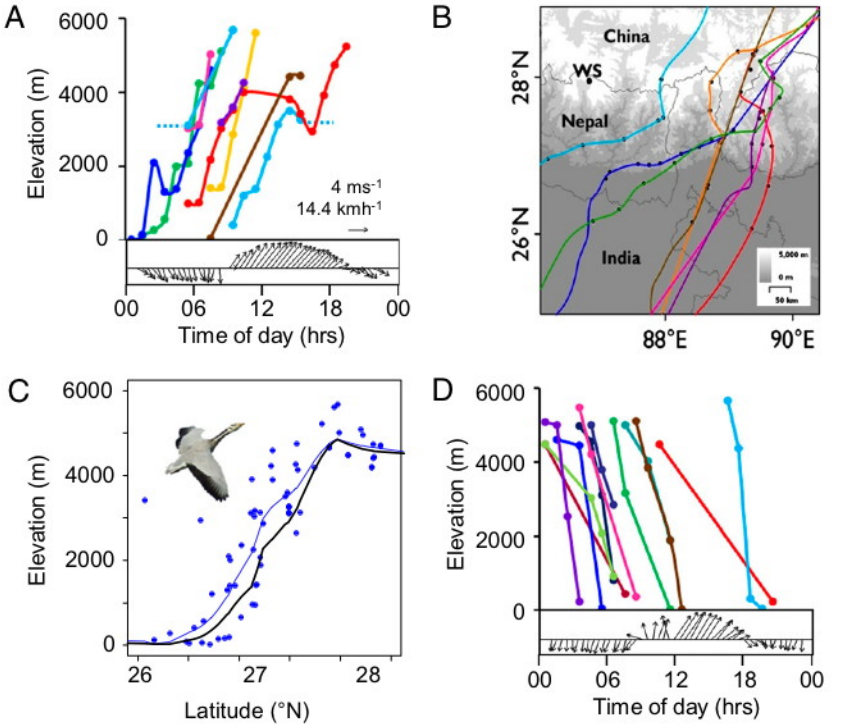


Fig. 1. Timing of migrations with 30-min average wind speed and direction from the Nepal Climate Observatory at Pyramid station for geese migrating (*A*) northward ($n = 8$) and (*D*) southward ($n = 12$) over the Himalaya. Arrows show cardinal direction (north pointing up to 0 °) in which the wind was blowing and arrow length (indicated in *A*) is proportional to wind speed in *A* and *D*. (*B*) Map showing the northward migration routes; weather station (WS) location is indicated. (*C*) Elevation of the mean northward track across the Himalaya (for all crossing locations from all eight geese), blue circles show individual data points and blue line shows Lowess smoother for mean ground elevation under the track (black line).