

ASIAN ALPINE E-NEWS

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Easternmost Himalaya (distant view) & Nyainqentanglha East, east Tibet

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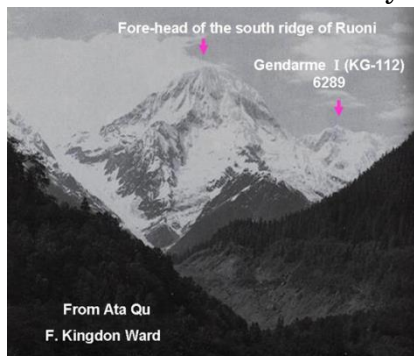
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Peak Identification, East Tibet: Method and Result

Tim Inoue

Introduction

Less information forces us hard work to identify un-known peaks in the east Tibet. But we can make the way to get the answer by the following scenario.



1) Start from one picture

From where was the picture taken? For instance, here is a peak “Choembo” picture taken by F. Kingdon Ward during his exploration through the Ata valley in 1933.

In 2006, when we had started survey of approach and climbing route of Ruoni, the highest peak in the Kangri Garpo Mountains, this picture was only one source to study the west and south face of the peak. The caption attached to the picture gave us no additional information of camera bearing and point unfortunately. We could not identify the peak by Google Earth which we could access at that time.

There is another way to exploit pictures taken on the airlines. Peak and mountain range pictures taken on the airlines Chengdu—Lhasa or Chengdu—Lin Zhi provide us useful information for peak identification.

Mining the Internet gives us many useful, but, uncertain pictures, taken by tourists. Many Chinese took interesting peak pictures in forbidden Tibet for foreigners. For instance, we had a plan to make an expedition to Tarlha Ri range in 2015. Even though we could get pictures of the east, north and west face. The south face one was missing. We could get the one in the Internet incidentally.

The photographer misunderstood the peak-name, but we could identify it as the south face of Tarlha Ri range.



Fig2 Unveiled hidden peaks in the Kangri Garpo
An aerial picture on the flight to Lhasa

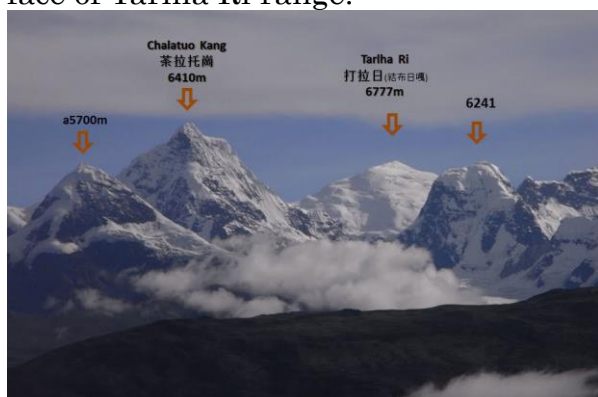


Fig-3 Internet image: Tarlha Ri

were taken by climbers and trekkers.

2) Useful maps

We cannot access the Chinese detail topography of the Nyainqentanglha and Kangri Garpo. Those are not open to foreigners. We can get the old Soviet Union maps. Yukio Matsumoto published nice skeleton map of Kangri Garpo under laying the Soviet map by painstaking work. Finally, Tom Nakamura assembled skeleton maps of the whole east Tibet. These maps are the basic tool to identify peak pictures which

Kone Kangri in the KangriGarpo was a missing peak in many years. An exploration team had tried to access to the peak and reached the snout of the glacier, but they could

their base camp and attack camp.

ALOS, The Advanced Land Observing Satellite, a Japanese satellite named “DAICHI”, opens “the ALOS World 3D—30m (AW3D30)” data to the public and is free of charge. A few interface tools are introduced to expert engineer. “Kashmir” is popular in Japan and easy to operate to utilize DSM.

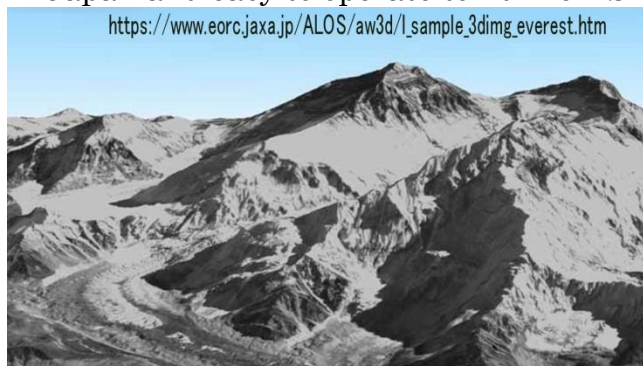


Fig-6 ALOS Sample Mt. Everest

The data of ALOS is same as Google Earth. Both solutions have accurate location data, and questionable peak elevation. The different heights are shown on the same peak in the two solutions. The reason is that the data review and evaluation process was not enough because of less cost. If necessary, it is required to order to a certain business unit for the precise DSM of focused area with payment. A precise sample of Mt.

Everest is attached to the Web site.

◇ Method of peak identification

In order to identify the peaks of East Tibet, the unknown target peaks and well-known reference peaks picked up from the skeleton map “East of Himalaya, Mountain Peak Maps” should be plotted on Google Earth and ALOS-based Kashmir map with peak ID. Downward, the well-known peak will be the datum point to search surrounding unknown peaks. The wide and zoom pictures of well-known peak become good guide for searching. In addition to the reference peak, surrounding peaks found on Google Earth and ALOS should be plotted on the map with tentative ID and elevation data.

Next, review date and time, place of the shot and additional information of the newly acquired pictures. If the peaks have unique feature points, it is useful to identify. If the travelling photographer had a GPS receiver, tracking record can indicate the location of the picture because digital camera has date and time in each picture data. It is easy to make a same 3D simulation shot of the target picture on Google Earth or ALOS by using the picture location. In case of aerial picture, flight record provides shot location as well. Sequential shots of aerial picture easily suggest the location even though those shots have a few lacks.

Kone Kangri in the Kangri Garpo is a missing peak for years. The location of the peak is clearly pointed on topography. Searching Kone Kangri on the road through Parlung Tsangpo by using Google Earth 3D image, a visible area was found in the upper part of Yupu Village. It was easy to find pictures of the peak in the database of PC.

Reference data and tool

1. Skeleton map “East of Himalaya, Mountain Peak Maps”
2. Google Earth and Google Map
3. ALOS data and Kashmir map
4. GPS data: Expedition record, traveler ; tracking data
5. Digital camera Picture and Time Data (yyyy- mm- dd- hh-mm-ss)
Unique feature of picture
6. Flight tracking data Flight Number, Date
7. Report of expedition and travel

◇ALOS data

- ✧ URL: <http://www.eorc.jaxa.jp/ALOS/aw3d/index.htm>
- ✧ ALOS (DSM) 「ALOS World 3D - 30m (AW3D30)」 JAXA
- ✧ ALOS: Advanced Land Observing Satellite(DAICHI)
- ✧ PRISM: Panchromatic Remote-sensing Instrument for Stereo Mapping
- ✧ Earth model: WGS84
- ✧ data: DSM (Average)
- ✧ Digital Elevation Model(DEM) or Digital Surface Model(DSM)
- ✧ Accuracy: 5m
- ✧ Kashmir: <http://www.kashmir3d.com/ALOS/>

◇Experience

- The data of East Tibet, AW3D30 has noise and in-accurate data in certain area.
- The latest ALOS2 will be utilized in near future which has more accurate data.
- Kashmir is comfortable for analysis with colored contour line such as 6000 meter and others.
- Kashmir has a function to put names of peaks on the map. It is easy to identify peaks.

Elevation review of the Ata Glacier peaks

NO	KG-#	Name	ACKU	2009 measured	Soviet Map	ALOS	ASTER
1	KG-1	Ruoni	6882	6859	6805	6820	6841
2	KG-2	Lopchin	6805*	6814	6703	6748	6791
3	KG-3		6726	6740	-	6670	6698
4	KG-5		6340	6373	-	6325	6340
5	KG-6 III	Zyaddo	6025	6018	5903	5966	5999
6	KG-7	Schuvina	5873	5890	5699	5865	5873
7	KG-8	Shana	5614	5614	5593	5579	5571

Fig-7 Height comparison

The altitude data extracted from ALOS and Google Earth indicate lower height numbers on the sharp or thin summit structure peaks than that of actual. The satellite survey of the Himalaya will notice the apparent flattening effect. But a few data looks higher elevation than the data of the skeleton map. Google Earth and ALOS often indicate different elevations on the same peak. Peaks of some areas have

extreme low elevation data in ALOS; therefor careful evaluation will be required.

Data correction on Google Earth and ALOS by past operation like SRTM and ASTER has been executed and the revised up loaded data can be seen. But, it is not the case in East Tibet region.

ASTER: Advanced Spaceborne Thermal Emission and Reflection Radiometer (TERRA, USA)

SRTM: Shuttle Radar Topography Mission

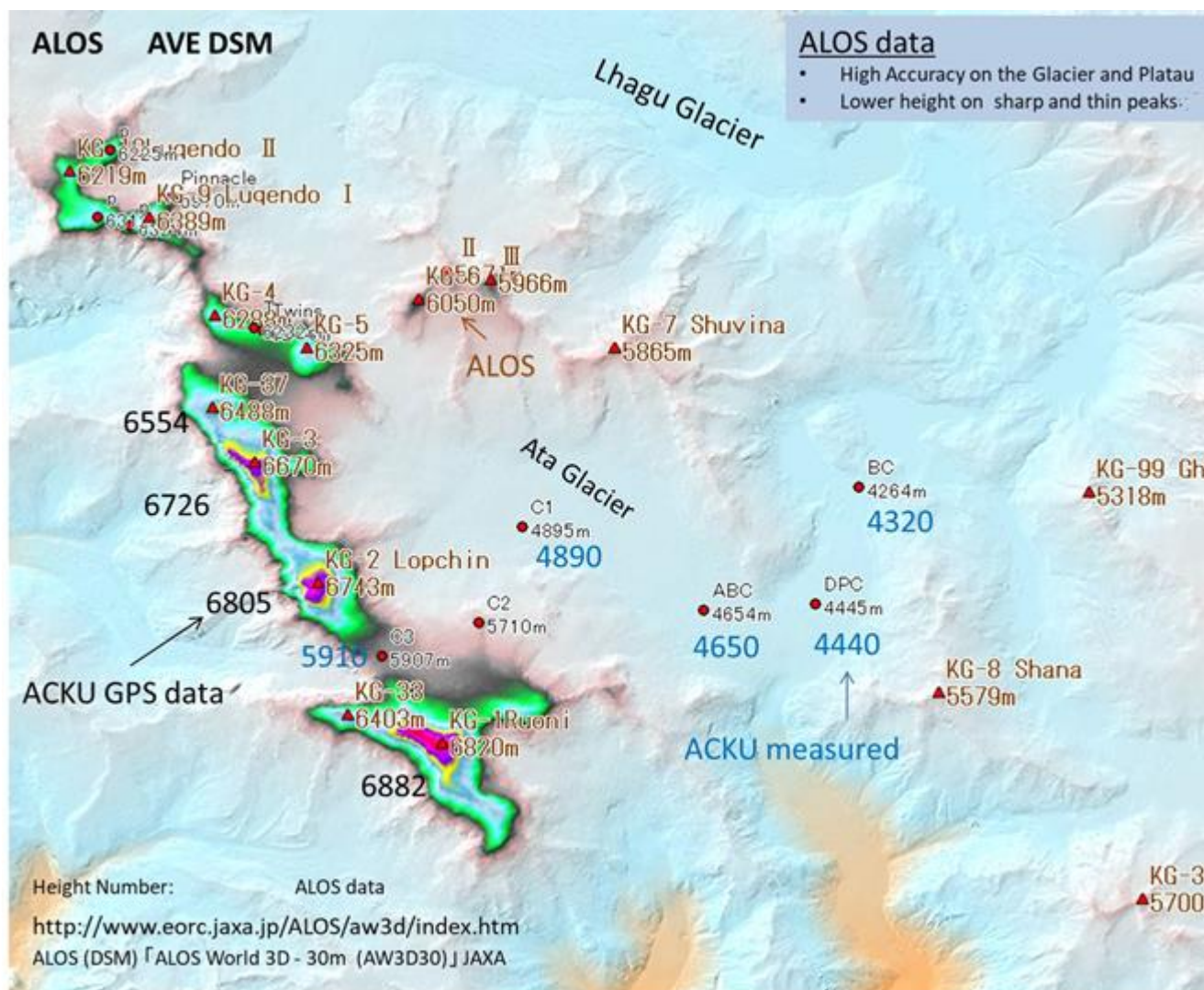


Fig-8 Review of the elevation in Ata Glacier peaks (Ruoni Feng 6,882m and surrounding peaks)

Flat surface of the glacier has accurate elevation against GPS.

The peak elevation of ALOS indicate lower numbers than the evaluated altitude.

◇ Identification of Zepu and Jalong range

Flight from Chengdu to Lhasa flies over the Nyainqentanglha Mountains. If weather permit, countless number of unclimbed peaks will appear and disappear in the window. Many beautiful pictures are taken by passengers. Those pictures will become important source of peak identification.

Flight number, date and time record of the digital camera indicate the location of the picture. Flight direction of Chengdu-Lhasa usually goes from east to west that means the shadow of mountain appears in south or north, not east or west. Analyst can narrow down search direction. Google Earth will provide an adjusted simulation image of the picture. Previously marked peak ID on Google Earth can be easily identified by the peak image.



Fig-9 Flight information and bearing of the picture found this area on Google Earth
Well known Zepu and Jalong Peak ID helps recognition.

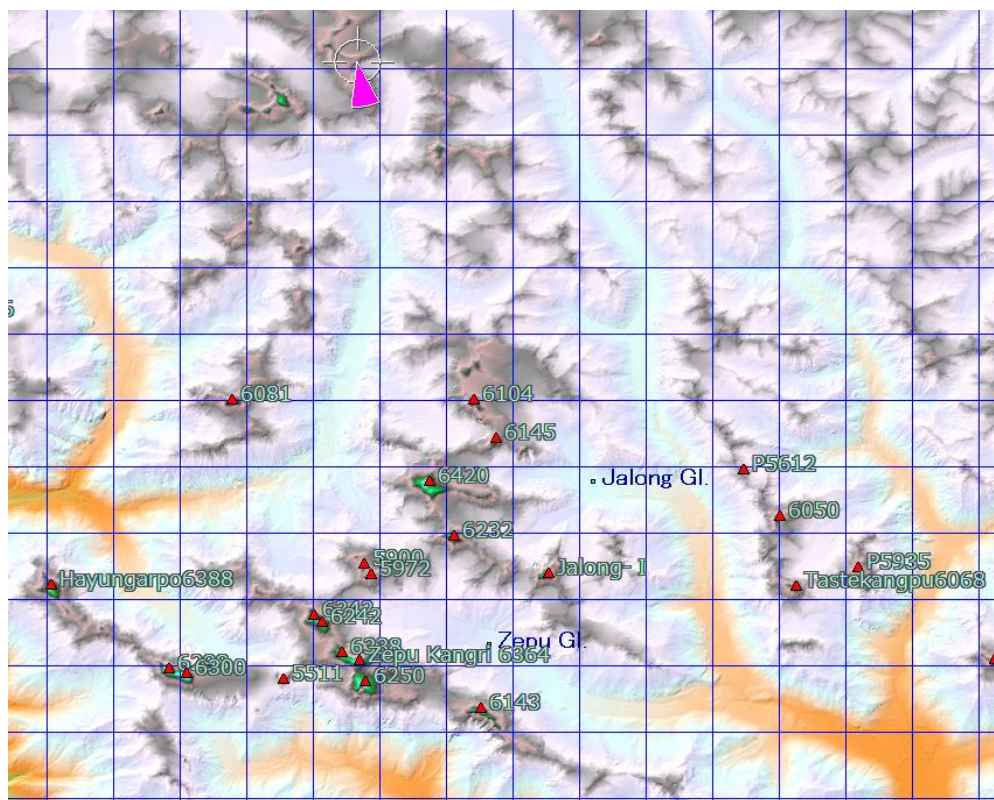


Fig-10 ALOS-Kashmir map of same area of Google Earth
Coloring helps feature of the range. Camera angle is shown on the map.

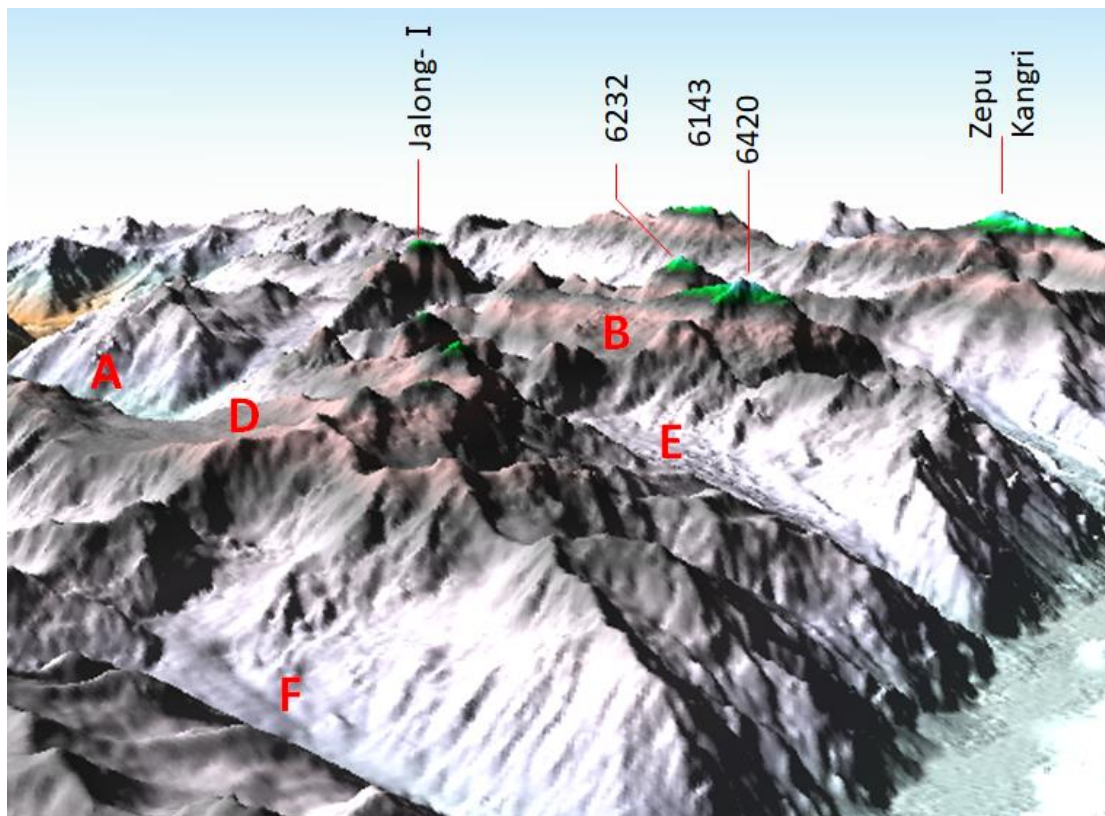


Fig-11 Simulated image by ALOS-Kashmir

劉 2015-4-20 成都—林芝

MG4006



Fig-12 Identified aerial picture of Jalong Zepu Range
 Previously fixed peak 6420m of Jalong indicate 6248m from ALOS
 The number 6420m looks too higher than actual.

◇Aerial picture identification : Mainri Snow Mountain(Kawagebo) & Kangri Garpo

The flight Chengdu-Lhasa or Lin Zhi flies over Sichuan Mountains. Minya Konka and other rocky mountains will appear in the window and the flight will approach to the Nyainqentanglha. Mainri Snow Mountain and Kangri Garpo Mountains are visible in the far south horizon.

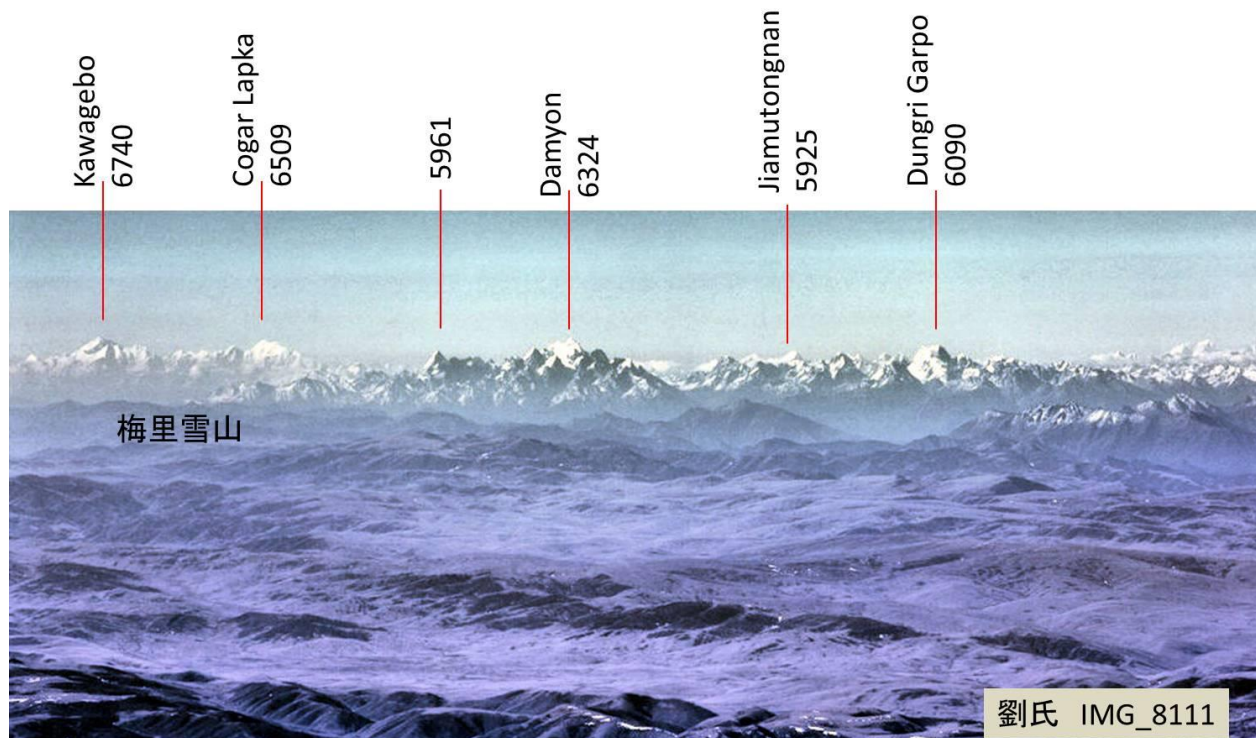


Fig-13 Flight information and Camera data suggested the range and Google Earth image fixed peaks.

Aerial pictures of the mountain range provide informative overview of the peaks. Hidden peaks stand in the deep valley often appear in the aerial view with those feature. Aerial picture is a powerful tool of peak identification.

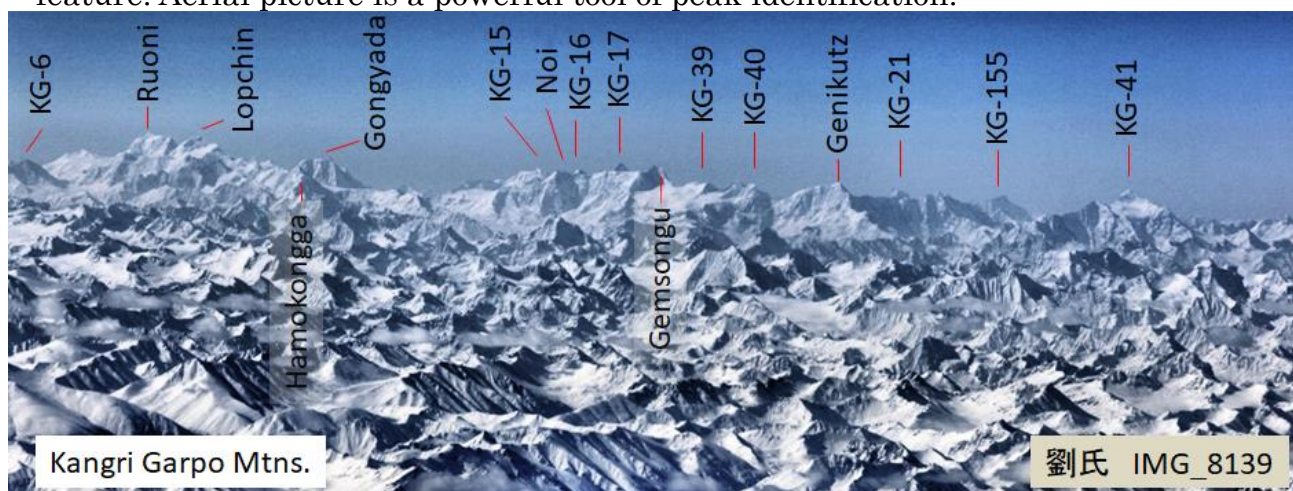


Fig-14 After comparison check by aerial picture with Sketch and skeleton map extracted from Google Earth, KG-21 and KG-155 those peaks are not visible on the ground appears.

◇ Known peak and unknown peaks are in the same picture: Pulongu Range

To identify the peaks in the Nyainqentanglha, Namcha Barwa is a powerful reference point. In case of Pulongu Range, the aerial picture captures Namcha Barwa and Gyala Peri in the south. Therefore it was easy to find camera bearing. At first Pumobunji was fixed. Pulongu was identified continuously on the jointed serial picture. Jointed serial pictures are effective.

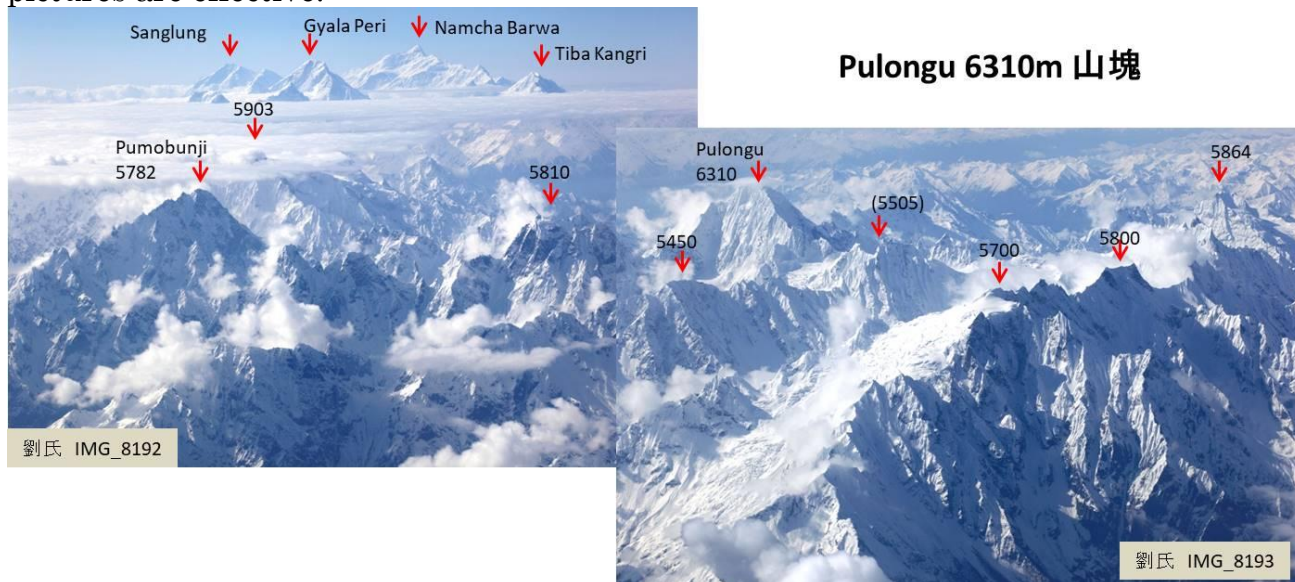


Fig-15 Many peaks were fixed by Namcha Barwa and jointed aerial image

◇Known peak and unknown peaks are in the same picture : Serial shot:
Jainija6586m



Fig-16 The result of Pulongu identification and time series of the flight suggested the area of the picture.

The picture (Fig-16) taken after taking Pulongu area includes Namcha Barwa and Gyala Peri. Position of these two peaks in the picture comparing with previous shot indicates progress of the flight to west. The two prominent peak of Jainija and P6444m stand side by side. This feature is also remarkable identifier. The image simulation was done by Google Earth. Elevation numbers of Jainija and P6444m are 6045m and 6002m in ALO. Those data are extremely low and questionable. Additional survey of this area should be retried.

◇Discovery of hidden Kone Kangri

There are still veiled 6000m peaks such as KG-21 KG-35 Kg-36 KG-54 KG-55 KG-57. Remote shots of KG-21, KG-35 and KG-36 exist, but are too small to recognize.

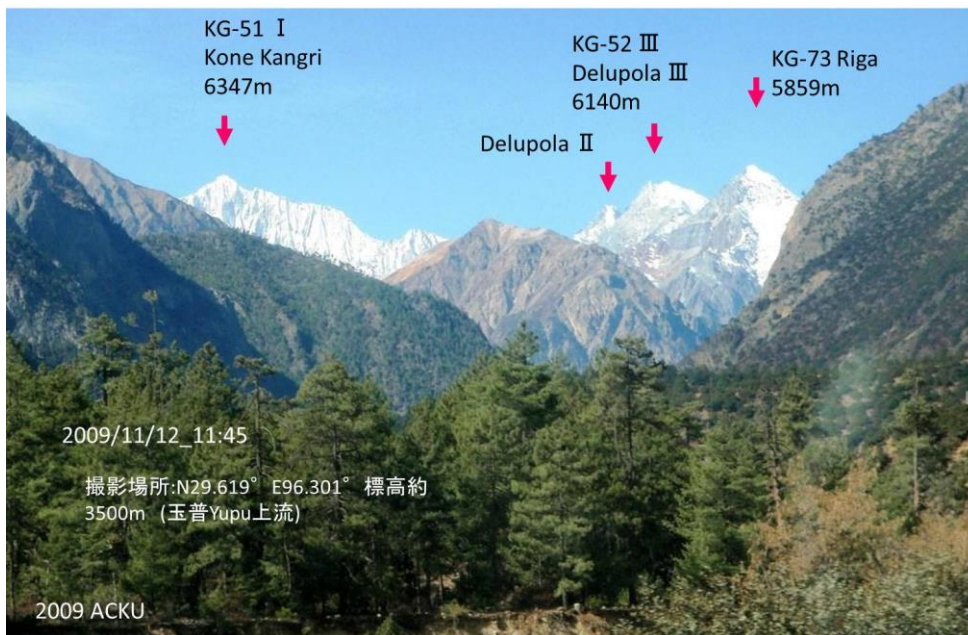


Fig-17 Unveiled Kone Kangri

In 1999, Gakushuuin party approached to Kone Kangri through Gone valley and reached on the snout of Gone Glacier. They could not see the peak unfortunately.

Since this exploration, this peak has remained as mysterious peak until 2009.

Lopchin

Expedition by Kobe University party had passed the road through Parlung Tsangpo and took many pictures of Kangri Garpo with GPS tracking data. The picture of Kone Kangri was included in those image data.

At first, as preparation, the peak was plotted on Google map with surrounding peaks which was extracted from the skeleton map and specially granted topography.

Searching view point on Google Earth 3D images through Parlung Tsangpo, good location near the village of Yupu was found. The date and time was gotten from GPS and the target picture was found in

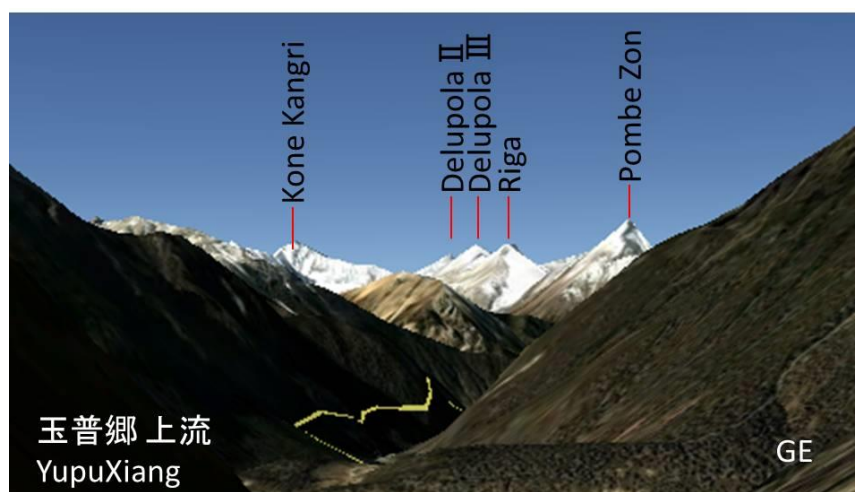


Fig-18 Kone Kangri in the 3D image of Google Earth
GPS and Digital camera data provided date stored file of the picture

the image database.

Digital camera and GPS is basic tool during travel and many pictures targeting unknown peaks will be reviewed after coming back home. We should instruct this way to travelers who are going into remote valleys and mountains.

◇ Sample of analysis operation by ALOS DSM with Kashmir

Kashmir has function of 3D imaging and Mapping with contour coloring pallet. These functions utilize clear mapping, image shot and pointing peaks. Pallet has flexible coloring with unlimited contour generation.

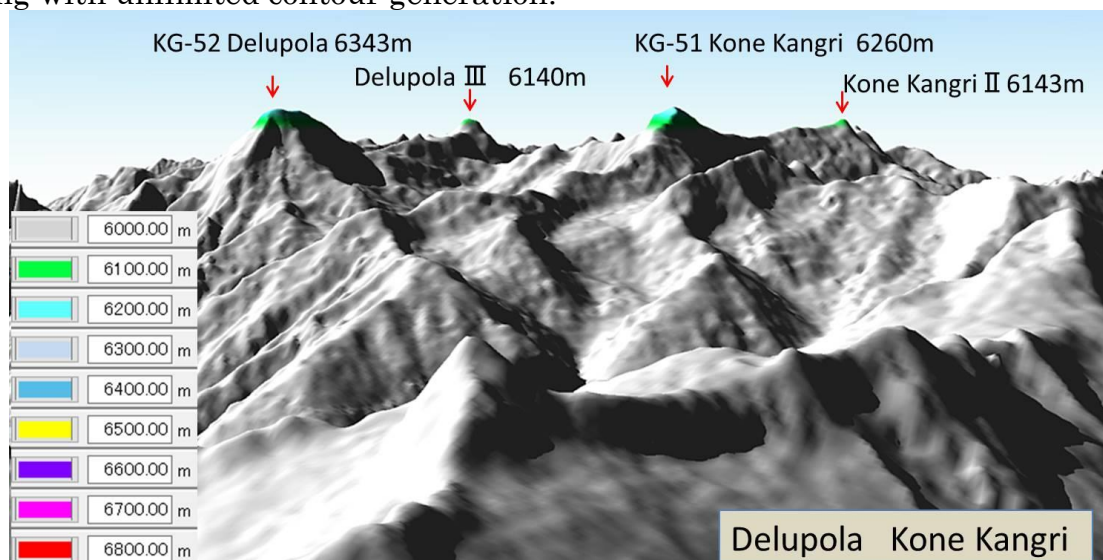


Fig-19 Pallet setting sample
3D imaging tool can put peak names and elevation on the summit.

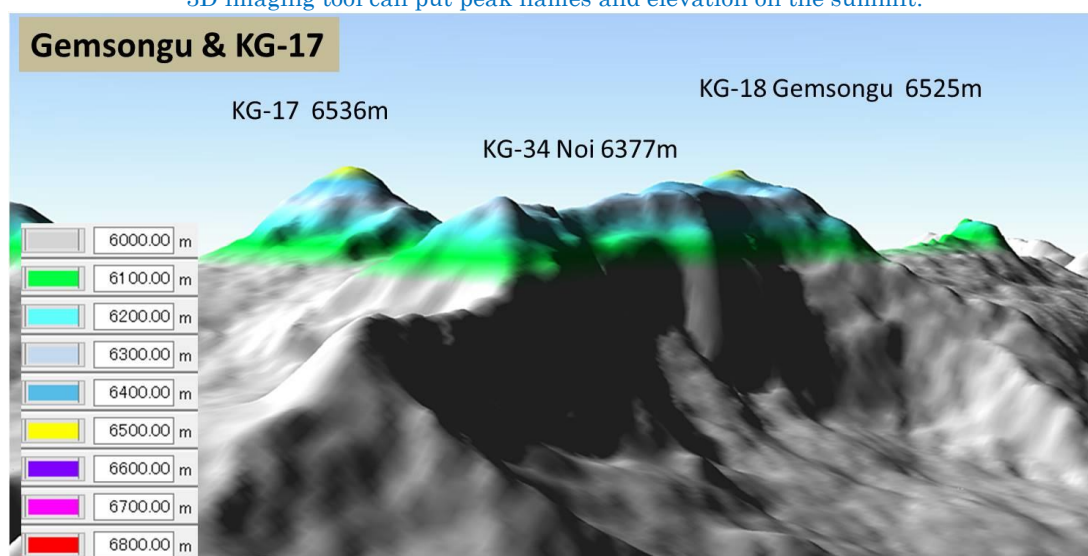


Fig-20 Coloring provides ease of reviewing altitude.

◇Browsing Internet: Tarlha Ri

“Tarlha Ri Range” is an independent range and visible from surrounding road. Therefore it is easy to get nice pictures. In reality, fine pictures of east face, north face and west face are in the binder. To find capable approach and line to the summit was an important issue. South face had not been unveiled.

The picture was found incidentally and fortunately through Internet browsing without key word because of misunderstanding of naming on that picture by the photographer.

Many pictures are pinned up on Google Earth and incorrect captions or wrong locations are detected. But, valuable picture may found sometimes.

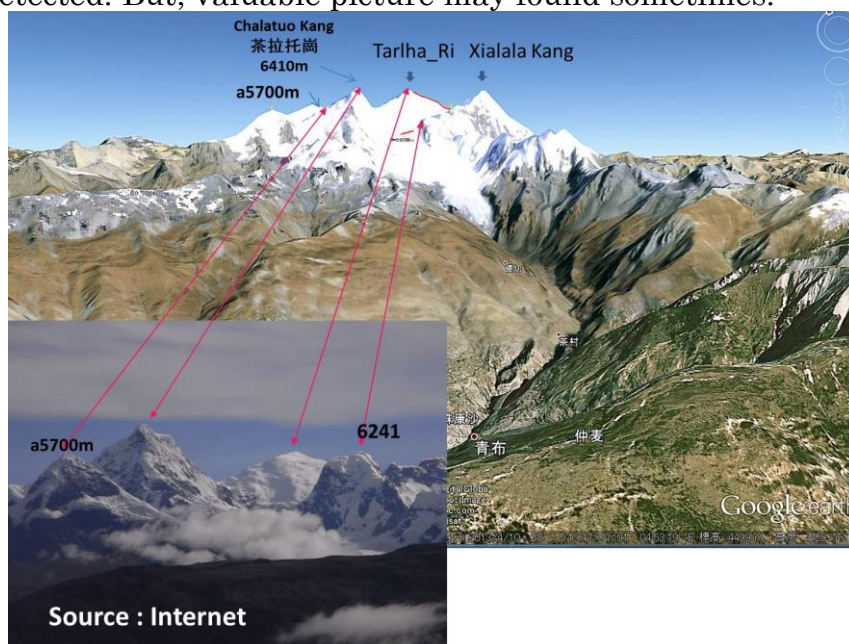


Fig-21 Internet Browsing helped finding searching picture of Tarlha Ri

◇ **Comparison of height number of Zepu Kangri; which is main peak?**

Zepu Kangri has three peaks on the summit ridge. These peaks have different three elevation numbers of Google Earth skeleton map and ALOS.

In Google Earth, the Peak 6338m elevation in ALOS is 6157m. To decide the highest peak, additional study is required.

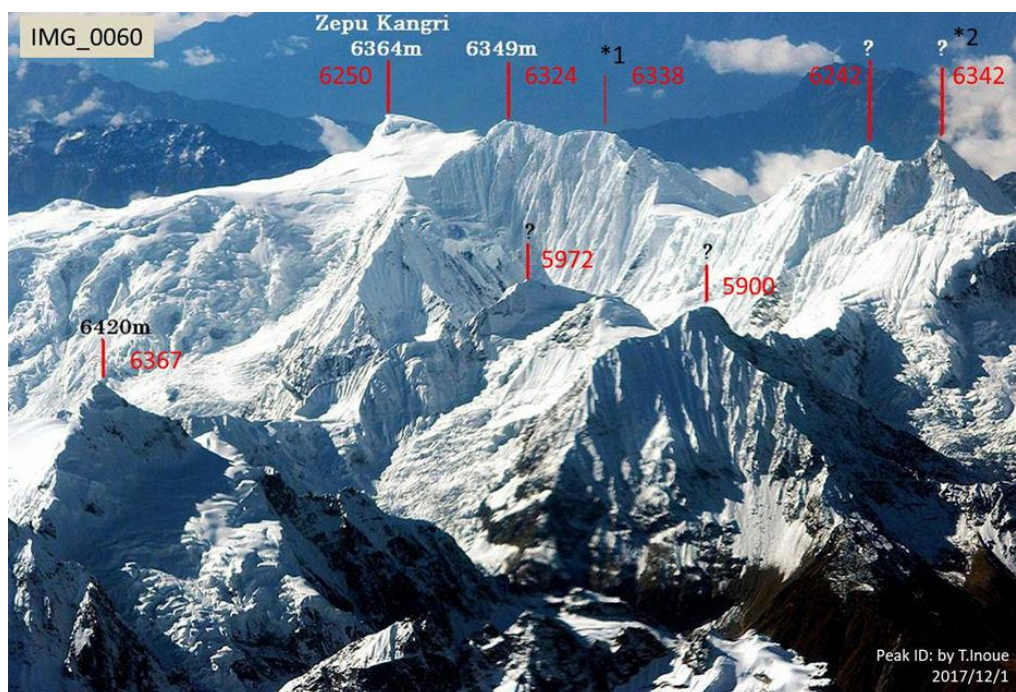


Fig-22 1: Lower position number is in Google Earth
 2: In Google Earth, peak *1 is the highest.
 3: In Google Earth, P6420m has the height of 6367m.
 4: In Google Earth, Peak *2 6342m is higher than Zepu Kangri
 5. White mark number is current fixed altitude.

◇ Unique point : KG-41(Kangri Garpo)

Explorers often go in to unknown deep valleys to survey peaks and tries to take pictures. Narrow sight in the valley prevents them from taking good pictures. They are perhaps obstructed by ridge and forehead of the peak even if they want to see the main peak.



Fig-23 Unique point

west fork. KG-41 should be visible at the confluence of two glaciers.

Zoom shot of KG-41(Fig-23) has a characteristic feature on the ridge. This feature is captured in the picture from Snow Dome (Fig-24) and peak identification of KG-41 is complete. Peaks with unique feature are easy to identify. KG-41 is captured in the aerial remote shot (Fig-14) of Kangri Garpo Mountains from Chengdu – Lhasa flight.

KG-20 (Genikutz)、KG-21、KG-40 and KG-41 stand in the back end divide ridge of KG-20 is invisible from Midui Longba. The east peak of KG-40 can be seen from Midui Longba, so that someone said KG-40 should be Genikutz. KG-40 is twins (West Peak and East Peak) and is visible in Xinguo Longba. Xinguo Glacier has two forks. KG-41 stands in the

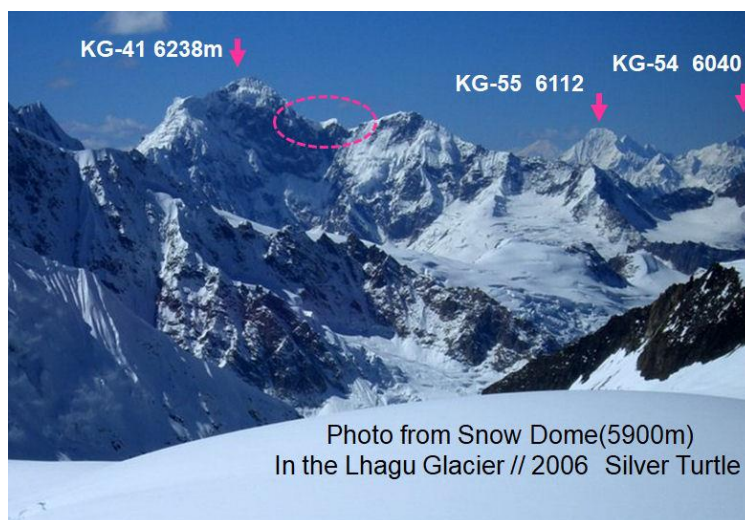


Fig-24 KG-41 Feature point

*****Other sample of the peak identifications*****

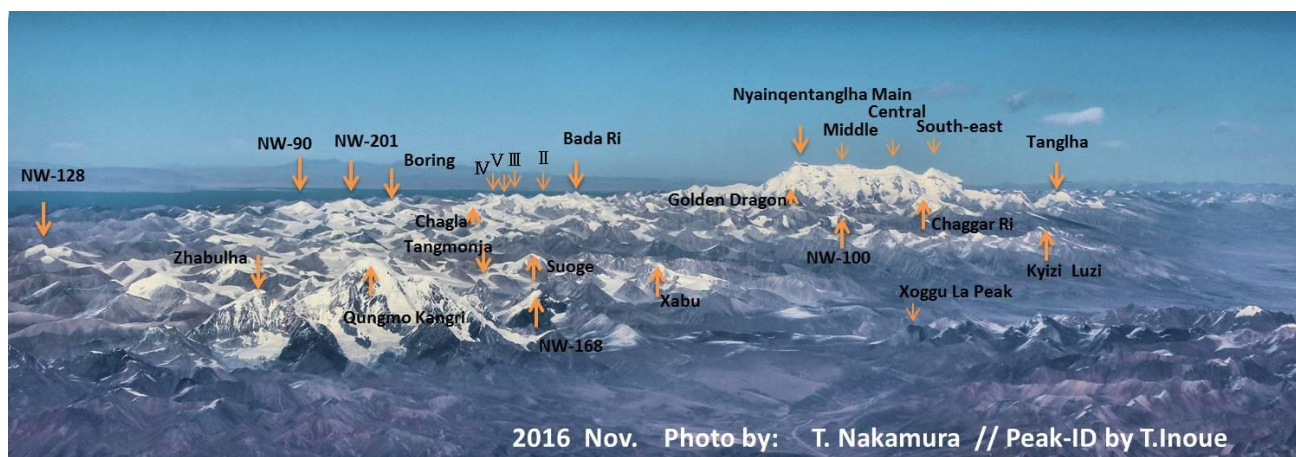


Fig-25 Nyainqentanglha West Mountains south face

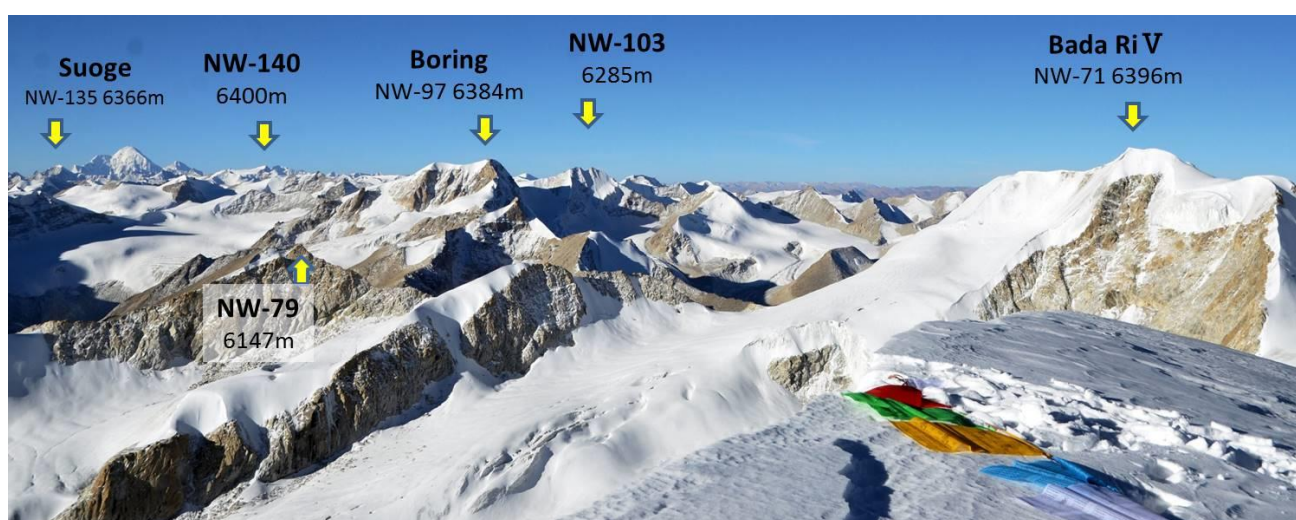


Fig-26 West view from the top of Ta Ri 6300m

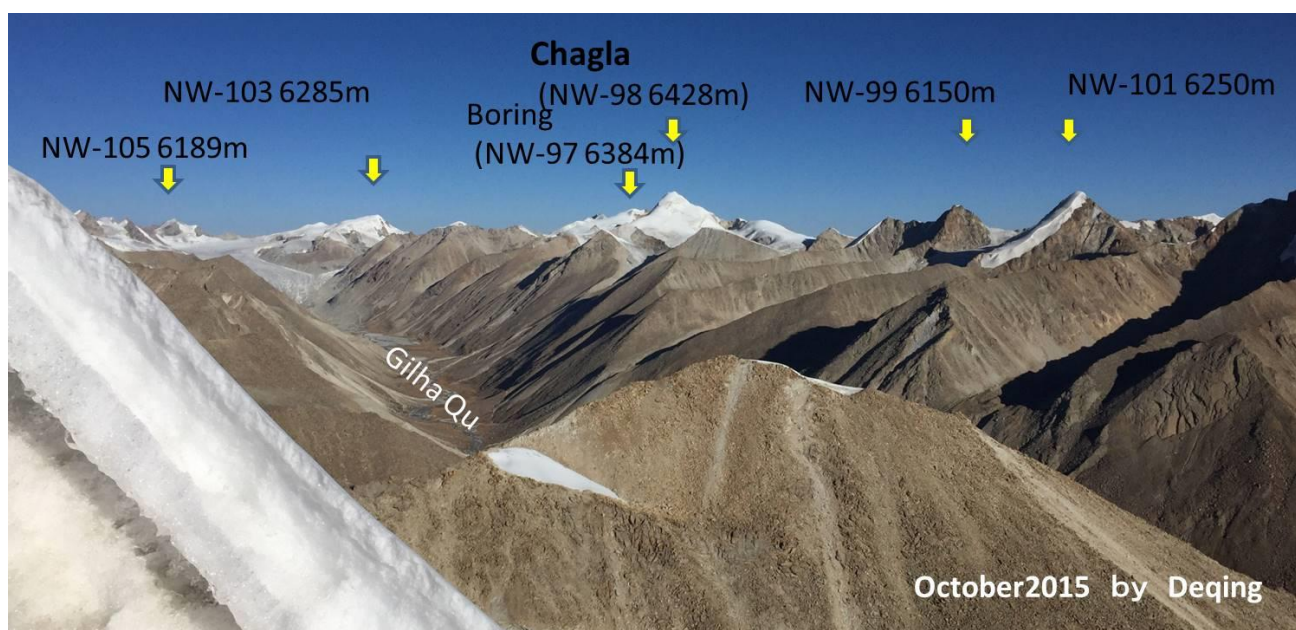


Fig-27 Chagla from the west ridge of Kyizi

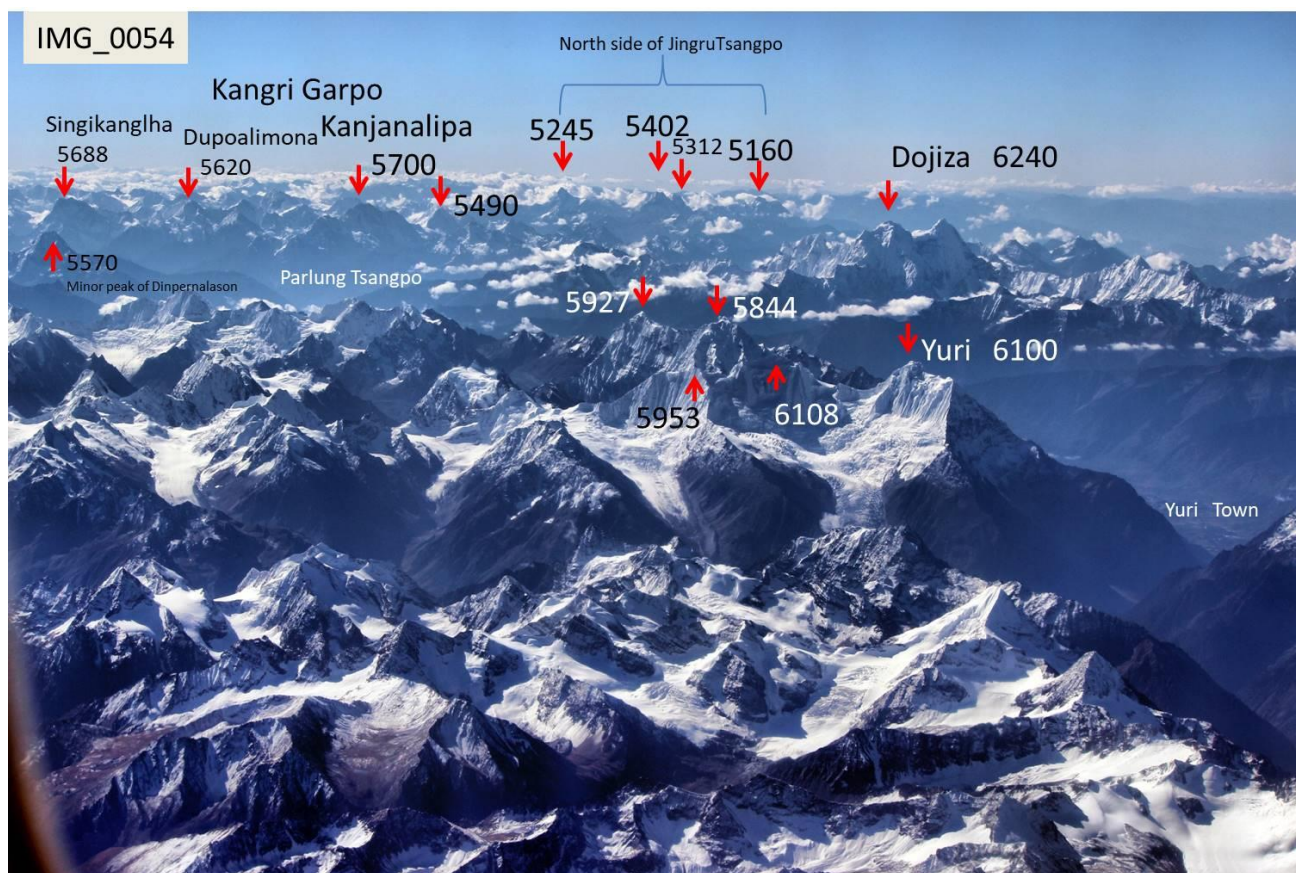


Fig-28 Dojiza & Yuri South - east view

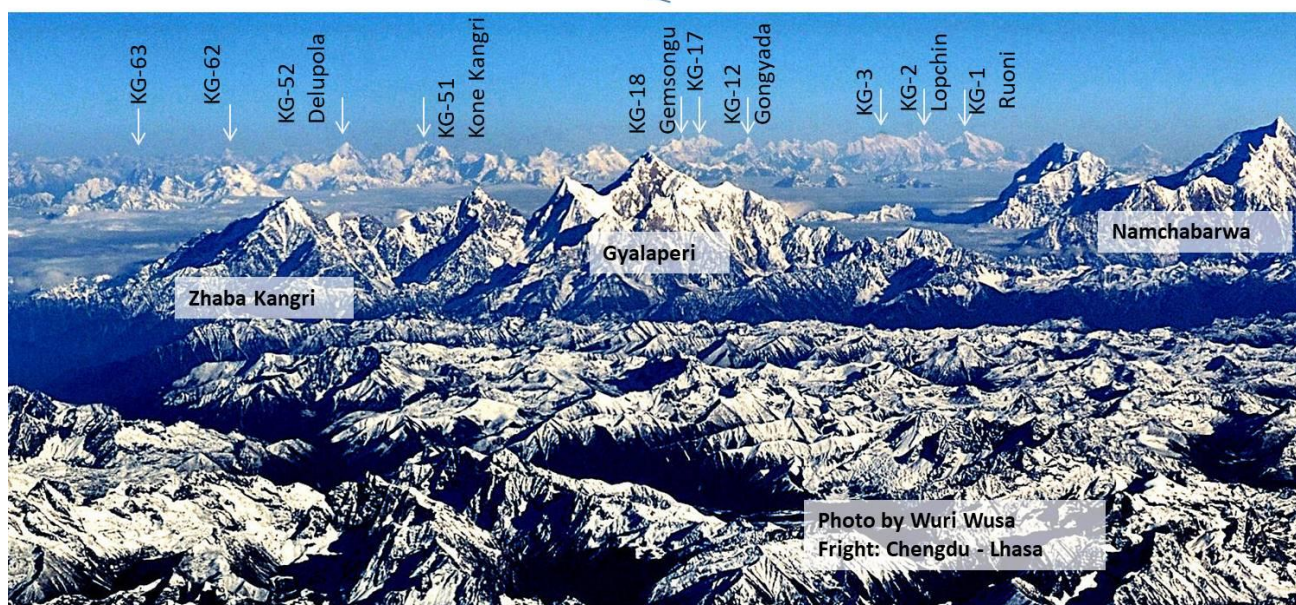


Fig-29 Namcha Barwa & Kangri Garpo

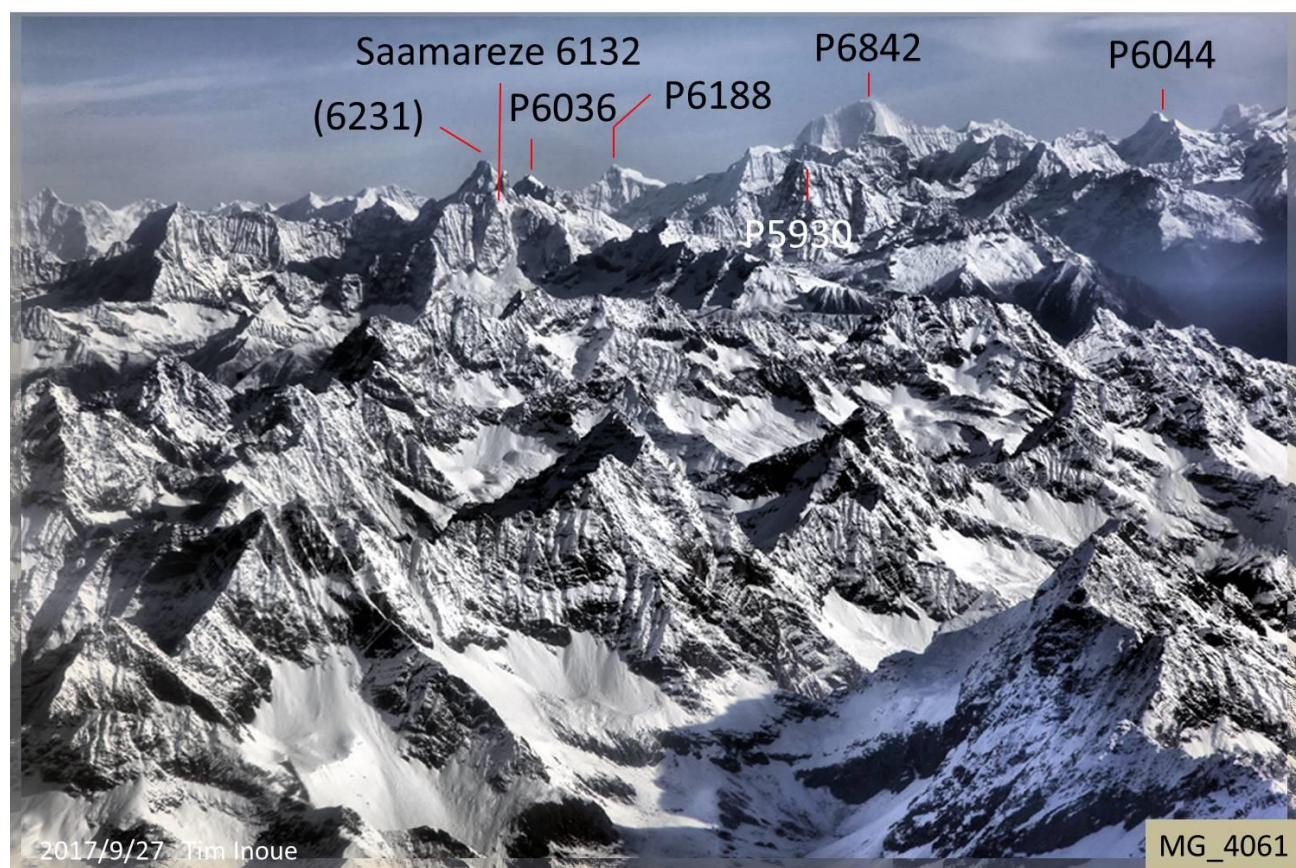


Fig-30 P6840m, Nyainqentanglha

The Grand Hengduan Mountains

大横断

寻找川滇藏

荒野中国系列
杨浪涛 主编

The Grand
Hengduan Mountains
Exploring Sichuan,
Yunnan, and Tibet



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在一次次对未登山峰的眺望和探索中，中村保显示出他超人的毅力和勇气，也为他赢得了中国横断山区山峰专家的称号。如今 84 岁高龄的他，时常回到那片梦想中的山区，去解开一个个关于山的谜团。

老人与山

撰文 / 马德民

无论从哪个角度探讨中国的横断山区，都避不开一位日本老人——中村保。

大多数登山者，即使是喜马拉雅山区的专家，大概也不能回答这两个问题：西藏哪个冰川的海拔最低？西藏哪个冰川的面积最大？

第一个问题的答案是 14 公里长的阿扎冰川，它的末端延伸至海拔 2440 米。第二个问题的答案是长达 30 公里、2 ~ 5 公里宽的来古冰川，它让我们想到巴塔哥尼亚和阿拉斯加的冰川。这两个冰川都位于喜马拉雅的东南部。

这些有趣问题的发问者，就是著名登山家中村保先生。他也是喜马拉雅山区最多产的未登峰探险家，在过去的 18 年中，他 30 次探索喜马拉雅东部的未登峰世界。超过 250 座海拔 6000 米以上的未登峰分布在西藏东南部、四川西部和云南西北部，详细的地图、照片和山峰信息给那些寻找未登峰的登山家开启了一扇通往天堂的大门。这些峰顶激发着攀登者的攀登欲望：这里有从未有人看见的沟壑、未被触动的山脊和未登的山顶。

出生于 1934 年的中村保，不仅是日本著名的登山家，而且也是世界认可的喜马拉雅山东部山峰专家。他是日本山岳会《Japanese Alpine News》杂志主编，在《美国高山年鉴》和《英国高山年鉴》等众多国际登山杂志撰写的文章受到广泛的好评。同时他也是美国登山俱乐部、美国喜马拉雅俱乐部、英国皇家地理学会和英国登山俱乐部的会员。2003 年，在美国 AAC 年会上，中村保做了“喜马拉雅山东部的阿尔卑斯山峰”的主题演讲；同年，日本山岳会《Japanese Alpine News》杂志推出《East of the Himalayas-Alps of Tibet》专辑，受到攀登界的好评；2007 年，中村保获得由国际登山联合会颁发的国际登山特别贡献奖；2008 年，英国皇家地理学会对他在喜马拉雅山东部的山峰研究颁发 Busk 奖牌。

“在攀登喜马拉雅山的黄金时代结束之后，一些被海拔 8000 米高峰遮掩的美丽山峰等待着我们的到来，不计其数的未登峰以难以置信的浩大气势召唤着攀登者的探寻。那些峰顶是惊人和壮观的，并且很多地区保持着悠久的历史传统文化。这些人迹罕至的峰顶与五条伟大的河流峡谷同生共存——金沙江、澜沧江、怒江、独龙江和雅鲁藏布江。1990 年，我开始对中国西部的边疆进行探索，然后集中在青藏高原的‘阿尔卑斯’山区——未知的峰顶和冰川在念青唐古拉东部、岗日嘎布山脉范围和三江并流区域。”尽管随着卫星全球定位系统和遥感技术的出现，卫星图像和其他先进制图技术的应用把世界描绘得更清楚，但是中村保依然如故地坚持他的探

险梦想。

1996年9月，中村保在“地平线报告会”上首次发布了喜马拉雅东部山峰的研究报告。中村保指出，这一广泛区域的主体包括西藏东南部、云南北部和四川西部的大量海拔6000米的未登山峰，将成为未来世界攀登的一个重点区域。

相对于大众熟知的西藏海拔8000米的高峰，喜马拉雅东南部的未登山峰几乎从未走进世人的视野中。一方面是这一区域交通不便，缺乏基本的地理测绘信息；另一方面，中国的山岳文化以传统的三山五岳为审美对象，喜马拉雅东南部的未登山峰并不完全符合这一审美标准。然而，西方地理地质学家们并没有遗忘这个被世人忘记的角落，苏格兰地质学家华特·古格里和瑞士测量专家英霍夫在其著作中都明确提到了“中国的阿尔卑斯”这样的字眼。

真正从攀登角度定义喜马拉雅东部的未登山峰是“中国的阿尔卑斯”的第一人是中村保，他在喜马拉雅东南部重点考察念青唐古拉东部山脉、岗日嘎布山脉和横断山脉，并用“East of the Himalayas-Alps of Tibet”作为自己著作的名称。这一观点受到国际攀登界的追捧，数年来，以著名登山家 Mick Fowler 为代表的一批喜马拉雅东部未登峰探索者相继完成一系列令人震撼的攀登路线，激发了攀登者们对这一区域的探索。今天，中村保依然每年跋涉在通往未登峰的路上，为攀登世界破解着一个个迷局。

“在山中，最大的问题是孤独，孤独对我来说是一种珍贵的财富，有时候是出自内心真正的需要；然而，从来没有一种痛苦。正是与这些山峰为伍，我每次都能在自己内心展开一段迷人的旅程，以便更好地审视自己，理解自己，并且更好地理解他人和自己周围的世界。”

“伴随着孤独和沉默的探险，有时也使我迷惑，更多伴随着它带来的所有奥秘。无论如何，我的天性仍然是孤独的观察者，大部分时间我是敏感的行动者。因此，我是一个梦想家，毫无疑问，我的事业在我们脑海中形成的时刻就开始存在。让我们记住，横断山是我们这个地球上最灿烂和多彩的一部分，它记录的不仅仅是我们的过去、现在，还有遥远的未来。”

不兄『横断山』(GRAN HENDUAN BOOK)出版

この度、中国で初めて横断山脉を多角的に取り上げた大作を
世に出されたと大変お喜び申し上げます。ヒマラヤの東に
連なる横断山脉は世界の山岳の中でも異色を存在です。
横断山脉を総合的に記述した内容の価値は計り知れ
ません。山岳のみならず地理、文化、歴史、民族、動植物を
広い視野で編集された記念碑的な力作です。
四半世紀に亘り、横断山脉を含むヒマラヤの東部踏査の成果
を『ヒマラヤの東：山岳図巻』(英語、邦語、中国語)に数回
に世界に紹介してきた中にとり、この度の『横断山』が
中国の多くの読者の関心を集めるに原動力となりま
せん。改めて出版に拍を打つてみます。2018年8月

中村保

横断山脉研究会(日本)会長
国際山岳連盟(IHAA)名誉会員
日本山岳会名誉会員

祝贺《大横断 寻找川滇藏》(GRAN HENDUAN BOOK)出版。

衷心祝贺中国首部多角度描述横断山脉的巨作横空出世。

位于喜马拉雅以东绵延不断的横断山脉，即便在世界各大山岳当中也独具特色。该书对横断山脉进行了综合性的记述，其内容价值不可估量。

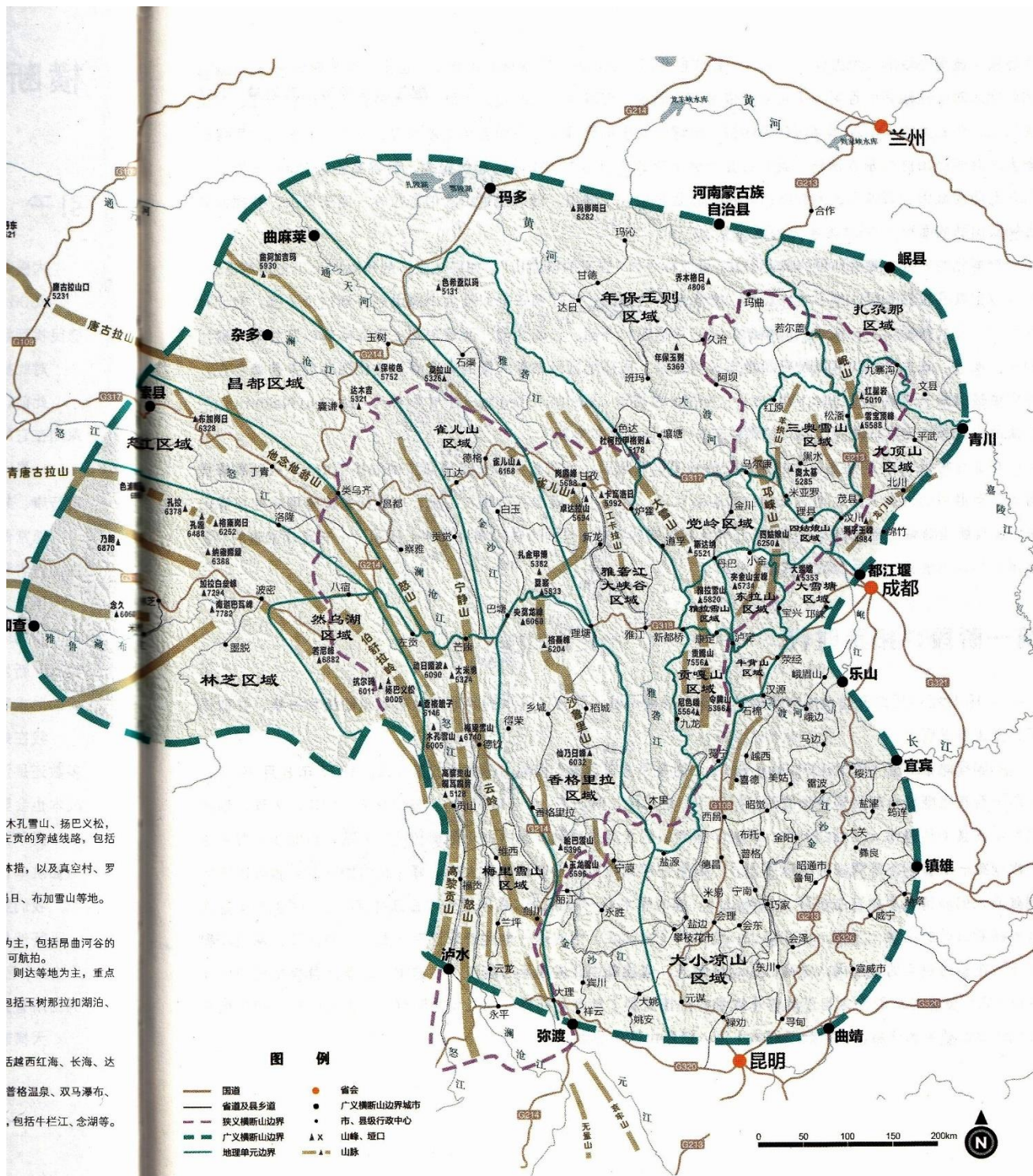
该书不仅展现了横断山区的山岳，还通过地理、文化、历史、民族以及动植物等多个视角进行了描述，堪称里程碑式的力作。

我曾历经25载实地考察了包括横断山脉在内的喜马拉雅以东各大山脉，将成果集大成本于《喜马拉雅以东：山岳地图册》(中英日译本)一书并公布于世，我发自内心希望此次《大横断 寻找川滇藏》一书的出版能够获得中国广大读者的关注。

对于该书的出版，再次表示深深的祝贺。

中村保

2018年8月



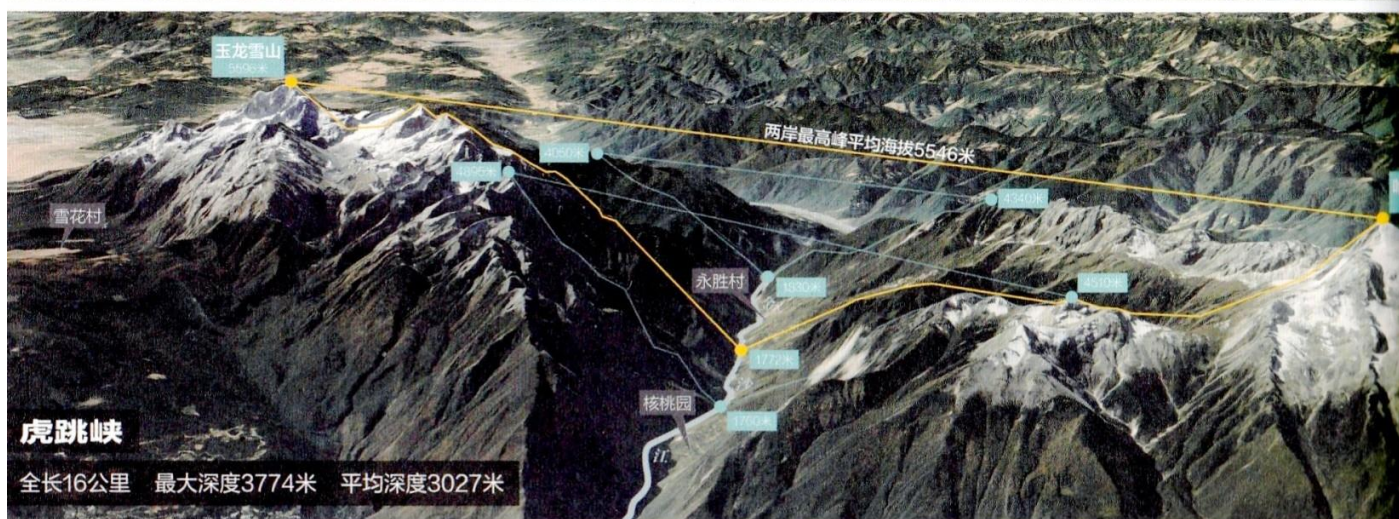
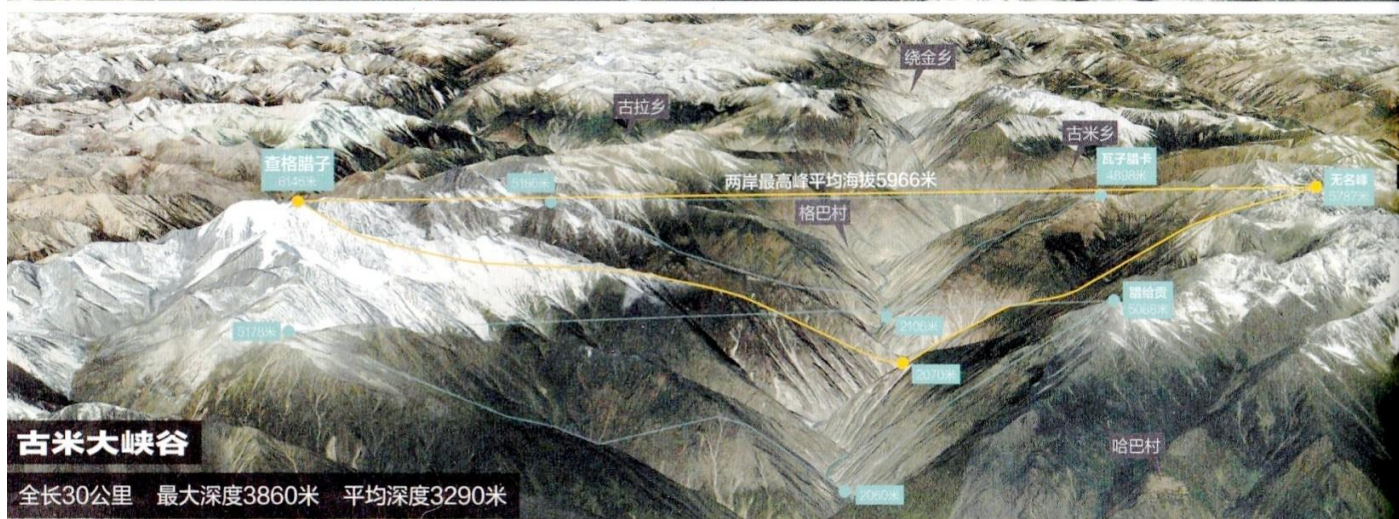
木孔雪山、扬巴松松、
E贵的穿越线路，包括
本措，以及真空村、罗
日、布加雪山等地。

为主，包括昂曲河谷的
可航拍。
则达等地为主，重点
包括玉树那拉扣湖泊、

舌越西红海、长海、达
普格温泉、双马瀑布、
，包括牛栏江、念湖等。

图例

- 国道
- 省道及县乡道
- 狭义横断山边界
- 广义横断山边界
- 地理单元边界
- 省会
- 广义横断山边界城市
- 市、县级行政中心
- ▲ X 山峰、垭口
- 山脉







鹅黄灯台报春
二郎山报春
靛蓝穗花报春
苞叶报春

偏花报春
云南报春
香海仙花

钟花报春
隐蕊杜鹃
宝兴百合
大叶金顶杜鹃

山光杜鹃
曲花紫堇
蓝玉簪龙胆
阿墩子龙胆

泸定百合
康定杜鹃
尖被百合
大百合





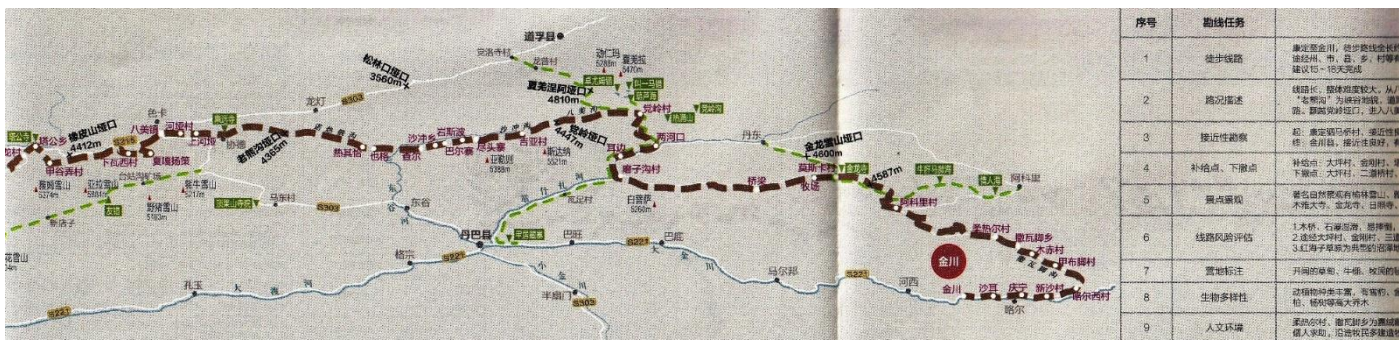
大理至哈巴村 勘线者 肖斌 刘国玺 王晨



训练时间: 2016年10月17日-2016年11月8日

序号	路线任务	内容
1	徒步线路	哈巴村享古村、金树岭30公里 本线从进入山口，经过草帽崖往核心区。穿越岩质地形有森林、高山牧场、金沙沟、高厚石壁、华利新堡、雪山山口等 建设17~20天完成
2	路况描述	海拔起伏较大，本线沿途最高海拔2287米，最低海拔4009米，途经海拔4000米以上山口17道，高山牧场12个，本段从兽人山，经过香炉峡保护区、穿过山地形地貌有森林、高山牧场、高山牧场、金沙沟、高厚石壁、华利新堡、雪山山口等
3	接近性资源	距 哈巴村、格吉乡约行、公路路 统 各各村、接近性资源。有公路
4	补给站、下营地	补给站：迪巴、雪拉措国家公园、老寨子、后安布卡（义武）等景区景区和加油站、机动车可通达 下营地：迪巴（新南）、棉阳镇、老棉嘴、有关公路通达，便于上下，后营地较好
5	景观资源	壮丽著名自然景观如雪峰、雪山塔、沃德塔、毛刺三神山等，大寺地亦为无人区，沿途有牧场、鹿生林、冰洞等，将华里群峰原生态呈现
6	线路风险评估	线路中关古道、新古道、央勇三个区域属远古人类居住，险峻及地质脆弱，潜在风险显著，建议物资及后勤强度加大，以驮马、向导等辅助人员安全救援
7	置标标注	村庄、牛棚、牧场等

哈巴村至各卡乡 勘测者 王猛 何涛 杨维恩



序号	路线任务
1	徒步线路 康定至金川，徒步穿越甘孜州 地州市、县、乡、村，行程 约1200公里，15天完成
2	路况勘察 线路长，坡度落差较大，从山 脚至山顶，路况复杂，高山 垭口、翻越险峻难行，主入无人 区
3	接近性勘察 勘察点分布广，接近性差，最 终：金川镇，距徒步线路约 100公里
4	补给点、下撤点 补给点：大坪村、安坝村、 下撤点：大坪村、二道坪村
5	难点预判 攀登山体自然岩体有峭壁、山 体坡度大，雪线高，日照强
6	线路风险评估 1.水灾、石质滚落、泥石流 2.迷路、方向感、迷路、 3.高原反应、高原缺氧、 4.高原紫外线等危害
7	震害标注 开展的地震、水淹、地质等 灾害标注
8	生物多样性 动植物种类丰富，有国家、 省、州级保护动物、植物
9	人文环境 藏家民居，藏村传统民居， 僧人朝拜，僧人收牧羊等藏族 习俗

金川至黑水 勘线者 单麟 李文莹

