

Prominence / Persistence of the
peaks of a real-valued function

Prominence / Persistence of the peaks of a real-valued function

(a.k.a. persistence theory in degree 0)

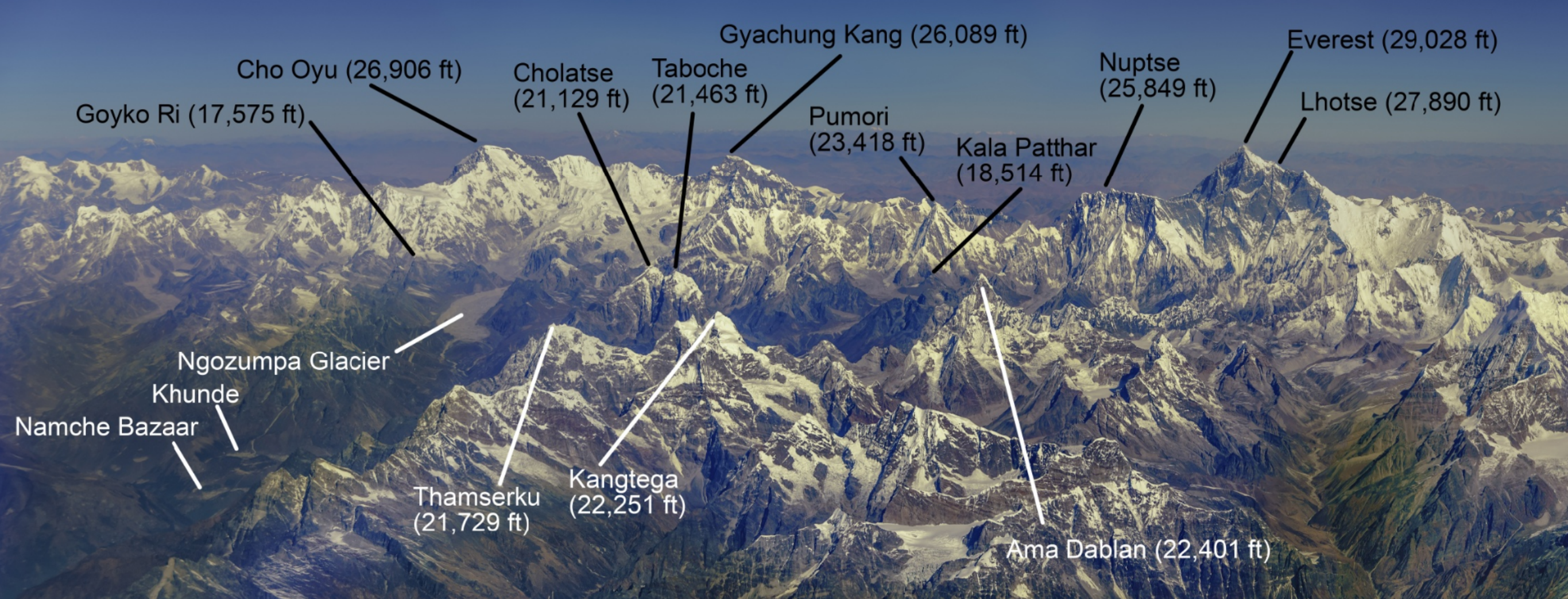


photo credits: Jim Block (<http://www.gigapan.com/gigapans/198046/>)

summit	continent	altitude (m)
Mount Everest	Asia	8849
K2	Asia	8611
Kangchenjunga	Asia	8586
Lhotse	Asia	8516
Makalu	Asia	8485
Cho Oyu	Asia	8188
Dhaulagiri I	Asia	8167
Manaslu	Asia	8163
Nanga Parbat	Asia	8126
Annapurna I	Asia	8091

prominence threshold : 500m

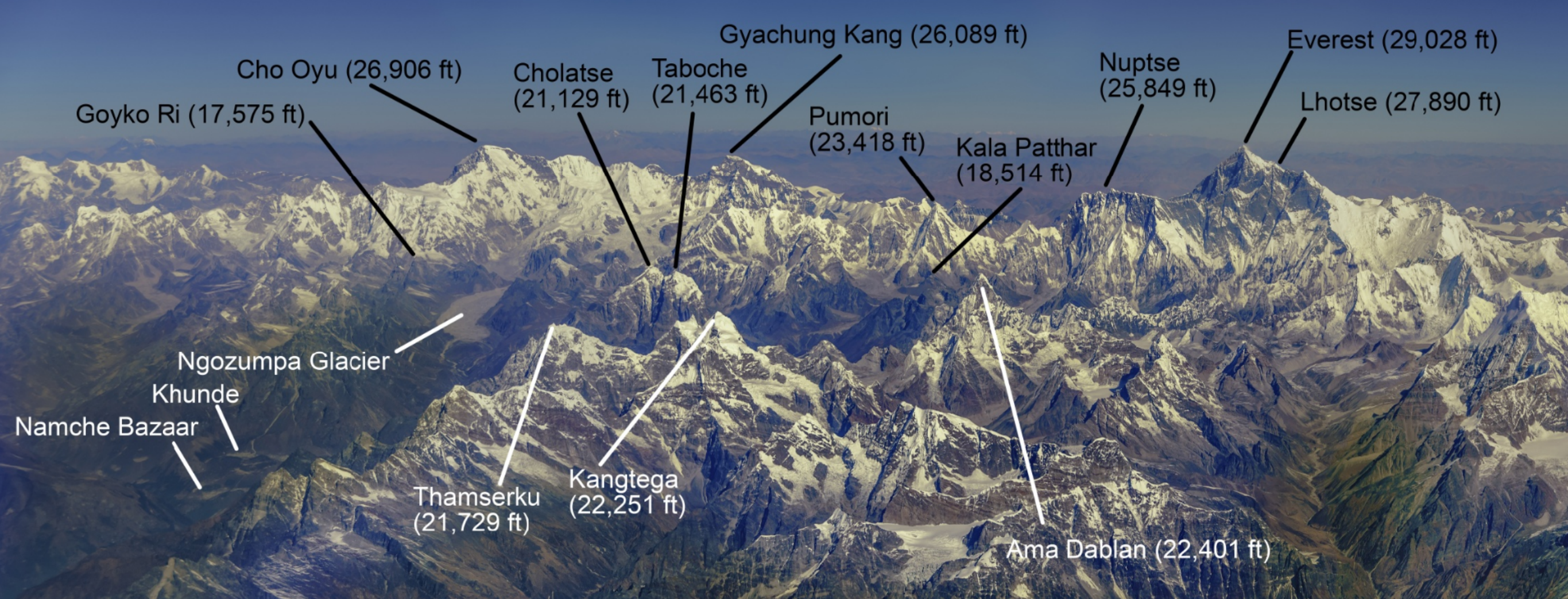


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summit	continent	altitude (m)	prominence (m)
Mount Everest	Asia	8849	8849
K2	Asia	8611	4020
Kangchenjunga	Asia	8586	3922
Lhotse	Asia	8516	610
Makalu	Asia	8485	2378
Cho Oyu	Asia	8188	2340
Dhaulagiri I	Asia	8167	3357
Manaslu	Asia	8163	3092
Nanga Parbat	Asia	8126	4608
Annapurna I	Asia	8091	2984

prominence threshold : 500m

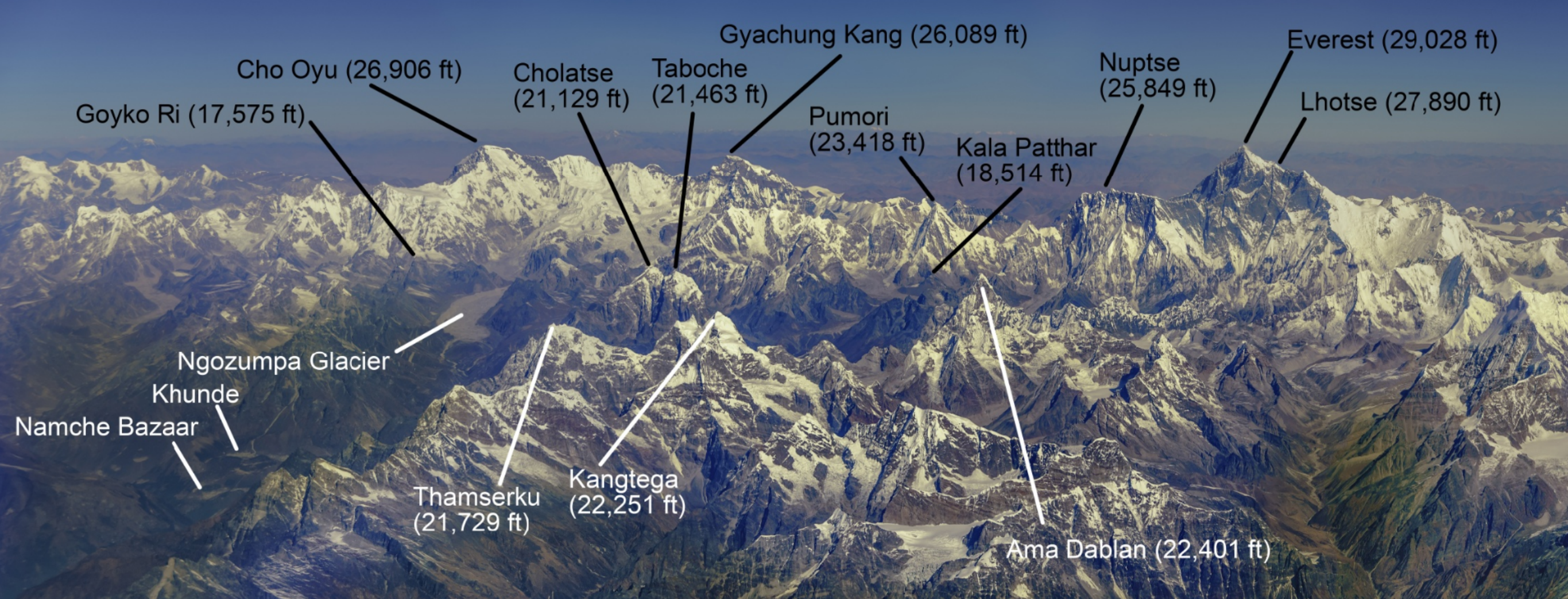
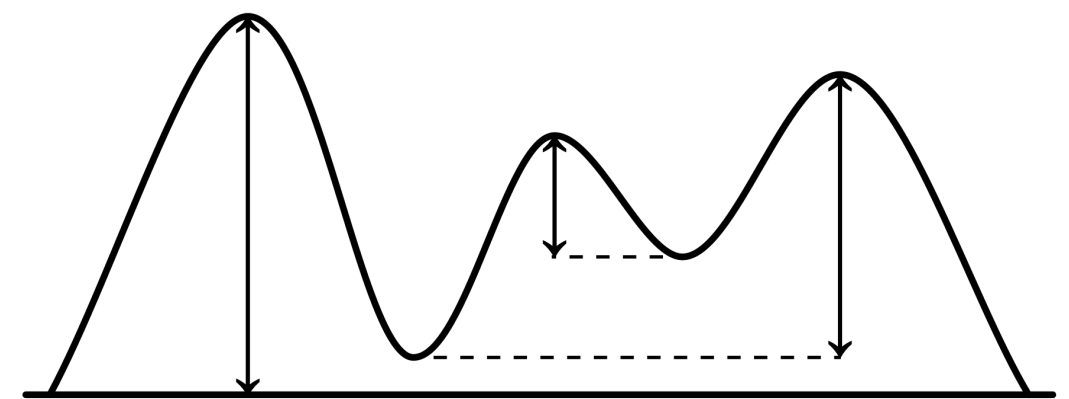


photo credits: Jim Block (<http://www.gigapan.com/gigapans/198046/>)

prominence of a peak
(according to alpinists):

*difference in altitude with the highest pass
allowing to reach a higher peak*



source: Wikipedia (<https://commons.wikimedia.org/wiki/File:Relative-height.svg>)

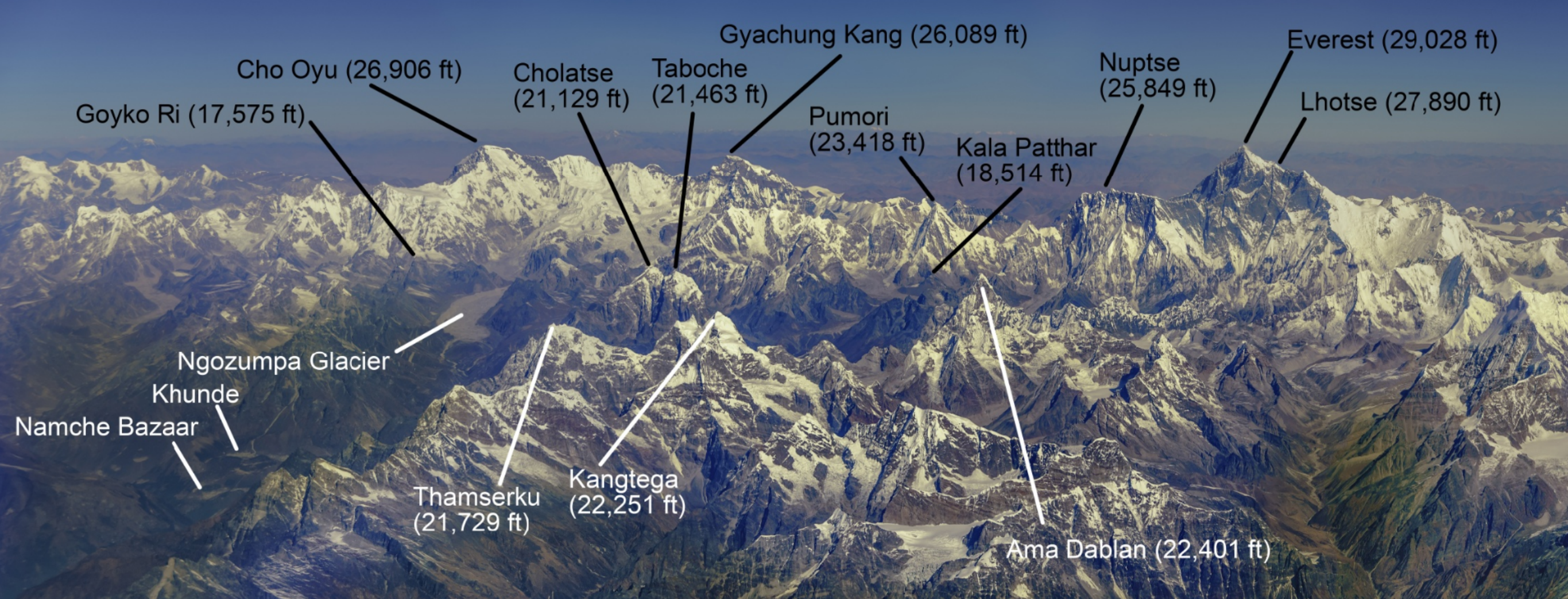


photo credits: Jim Block (<http://www.gigapan.com/gigapans/198046/>)

summit	continent	altitude (m)	prominence (m)	parent
Mount Everest	Asia	8849	8849	—
Aconcagua	Americas	6960	6960	—
Denali	Americas	6191	6155	Aconcagua
Mount Kilimanjaro	Africa	5895	5885	Mount Everest
Pico Cristóbal Colón	Americas	5700	5509	Aconcagua
Mount Logan	Americas	5959	5250	Denali
Pico de Orizaba	Americas	5636	4922	Mount Logan
Vinson Massif	Antarctica	4892	4892	—
Puncak Jaya	Oceania	4884	4884	—
Mount Elbrouz	Europe	5642	4741	Mount Everest

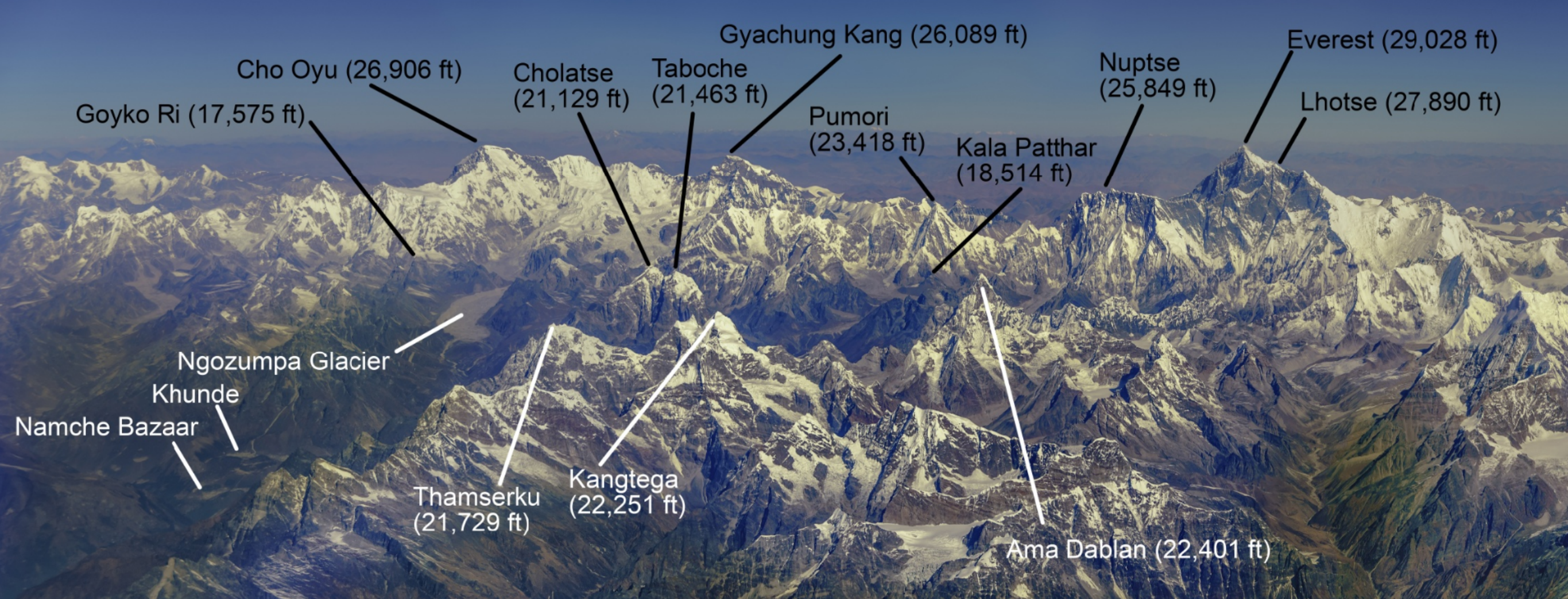
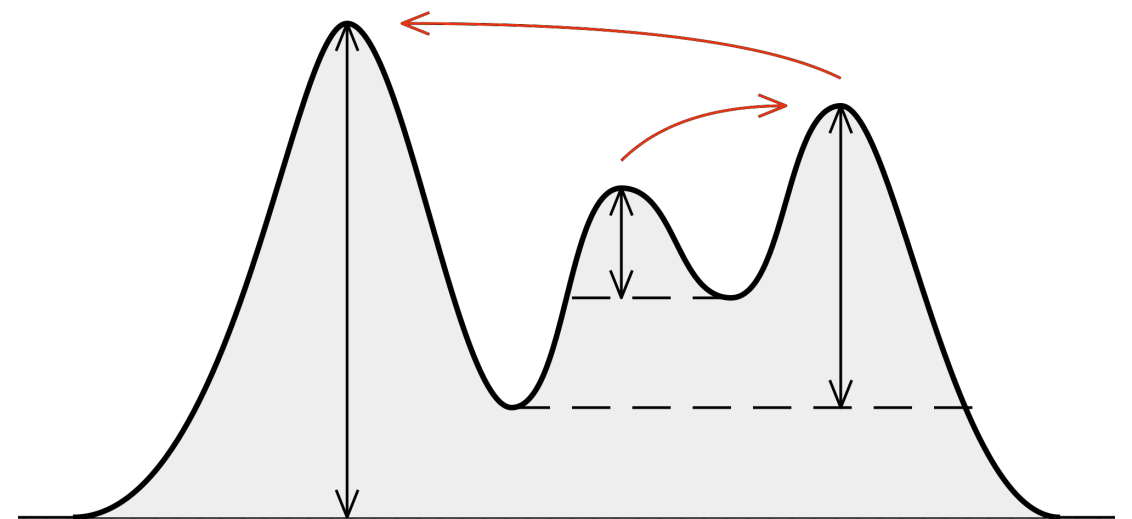


photo credits: Jim Block (<http://www.gigapan.com/gigapans/198046/>)

parent of a peak

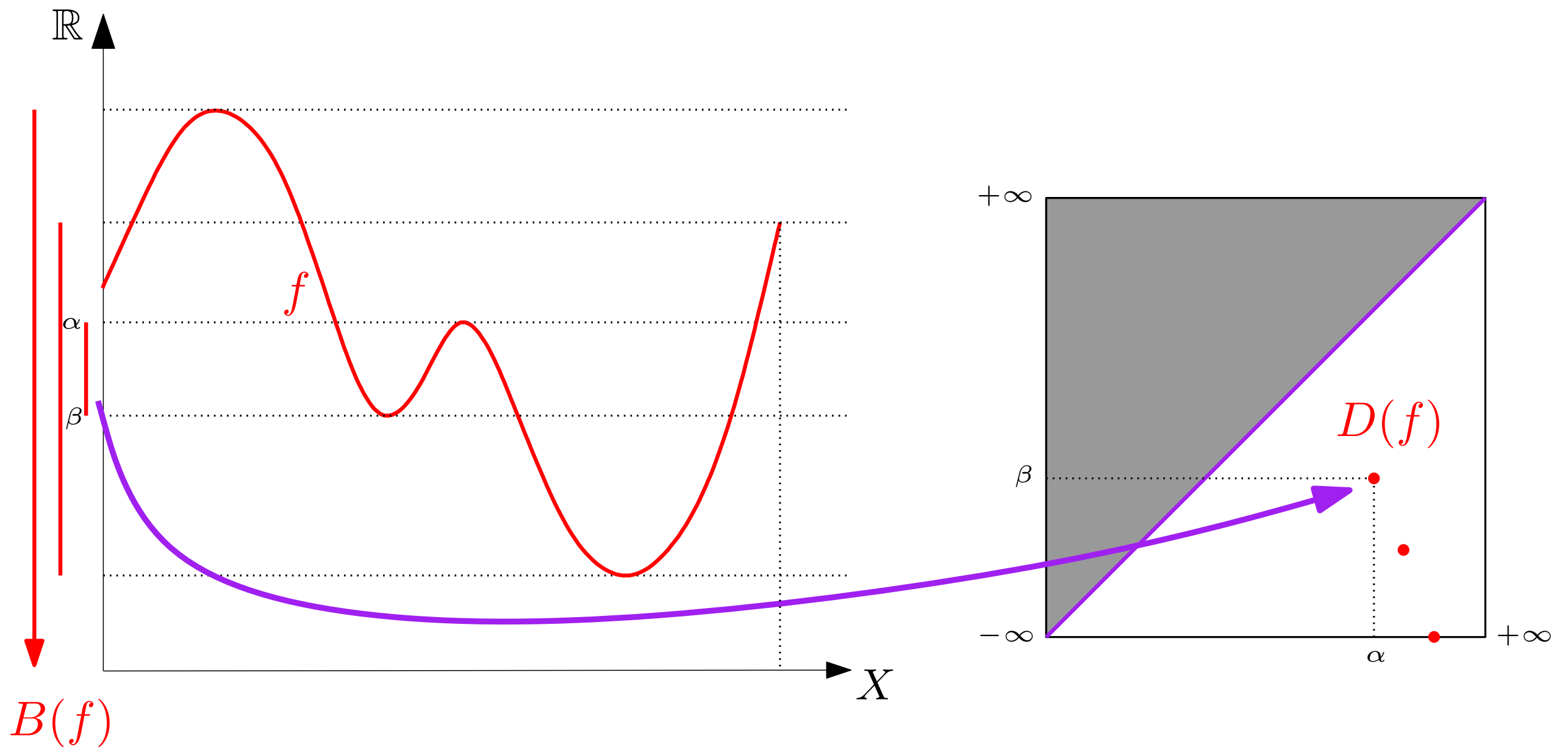
(according to alpinists):

highest peak accessible through the highest pass



source: Wikipedia (https://en.wikipedia.org/wiki/Topographic_prominence)

Persistence diagrams and stability



Persistence diagrams and stability

Theorem (Stability): [Cohen-Steiner, Edelsbrunner, Harer 2005]

For any $f, g: X \rightarrow \mathbb{R}$ satisfying (i)-(iii), $d_b(D(f), D(g)) \leq \|f - g\|_\infty$.

