

ALTITUDE

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Interest in altitude began with --

Mountain climbers

High altitude

Lighter-than-aircraft

Higher altitude

Aircraft and rockets

Into space

Sporting events

Moderate altitude

Altitude in Sport

How to prepare for altitude

(1968 in Mexico City)

**Physiologically
Competitively**

Domination by altitude natives

At altitude and
also at sea level

So – Sea-Level elite
move to altitude, and –
continue to win

**“Most winners of endurance
running events live at AL”**

**Most winners of endurance
Running events live near
the equator**

Which is more important?

**“Altitude is necessary
for success”**

and

Scientists become coaches

Areas of Agreement

AL is tougher than SL

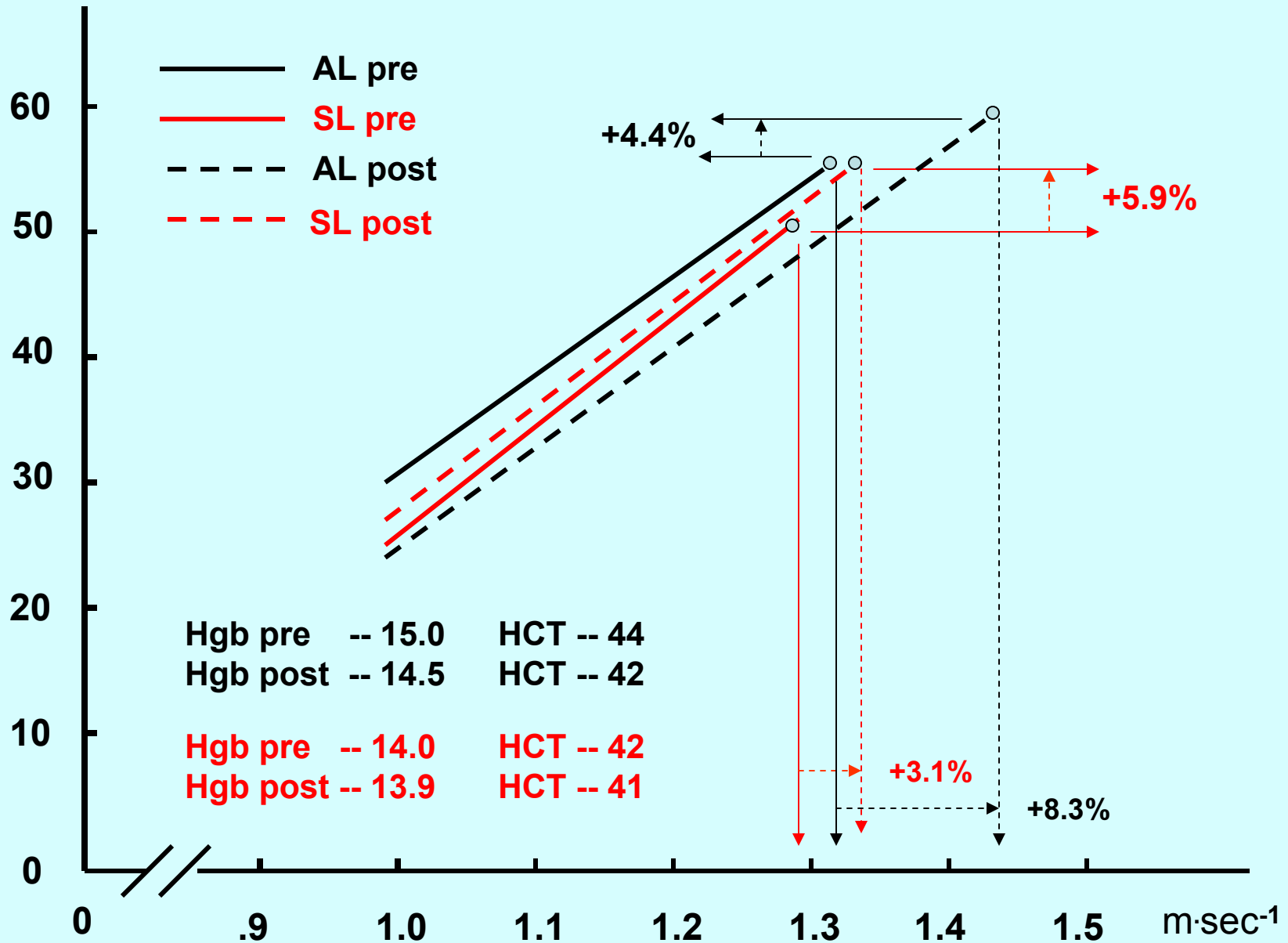
Training at AL = better at AL

Better speed at AL

Training at AL = better at SL??

SWIM DATA

VO₂ ml·min⁻¹·kg⁻¹



VO₂ ml·min⁻¹·kg⁻¹

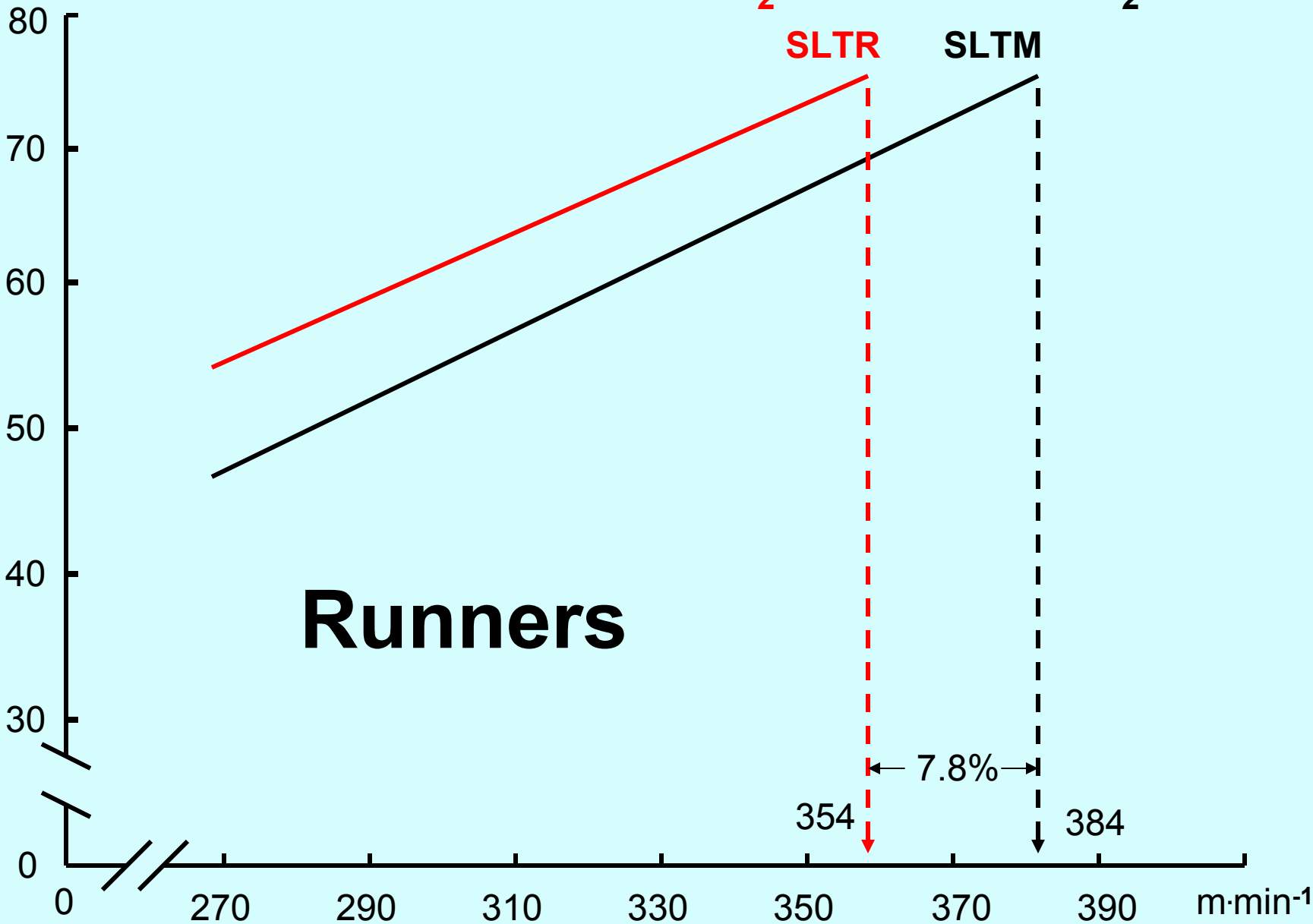
75.9 VO₂max

76.4 VO₂max

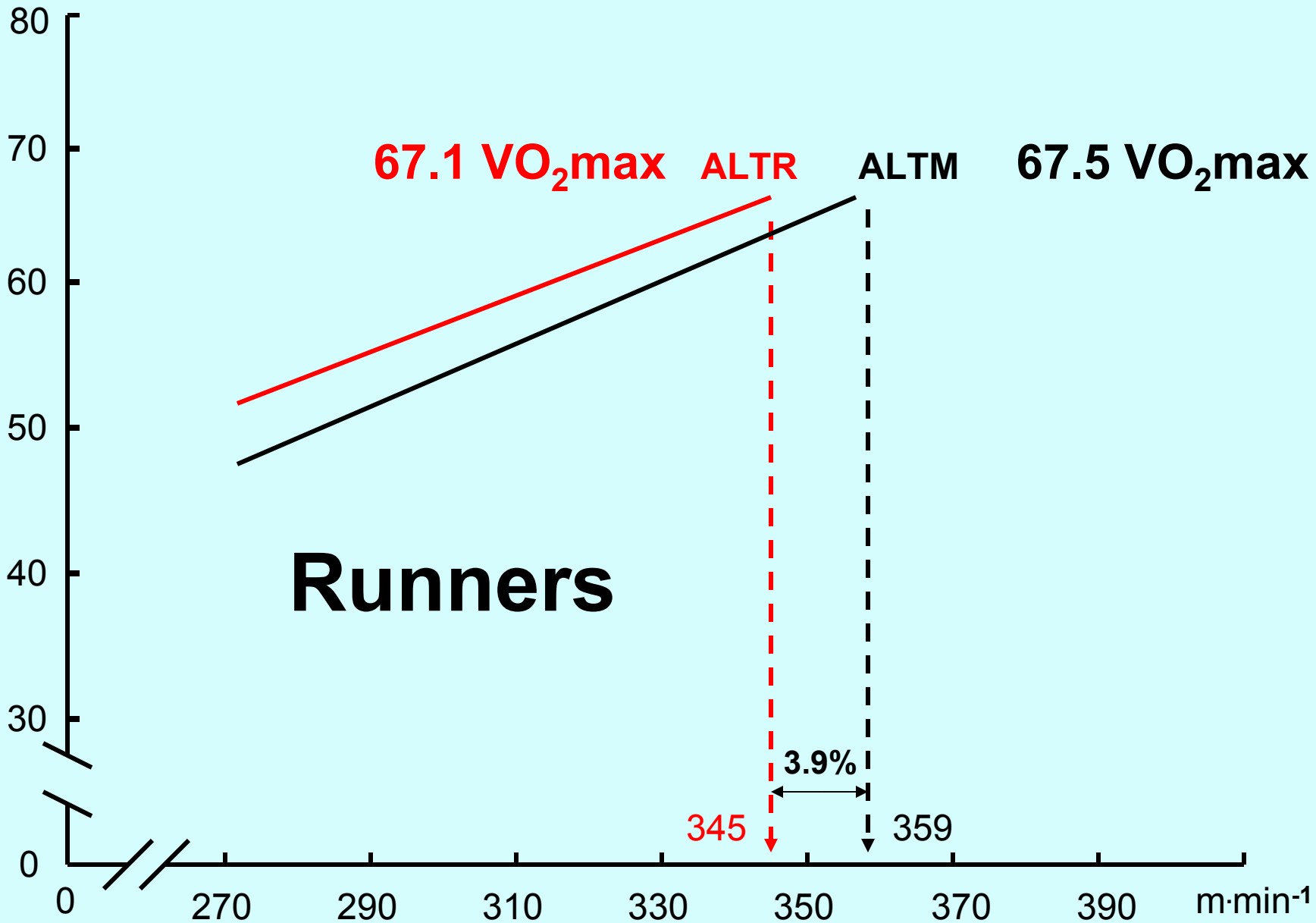
SLTR

SLTM

Runners



VO₂ ml·min⁻¹·kg⁻¹



67.1 VO₂max ALTR

ALTM

67.5 VO₂max

Runners

3.9%

345

359

m·min⁻¹

VO₂ ml·min⁻¹·kg⁻¹

76.4 VO₂max

SLTM

ALTM

67.5 VO₂max

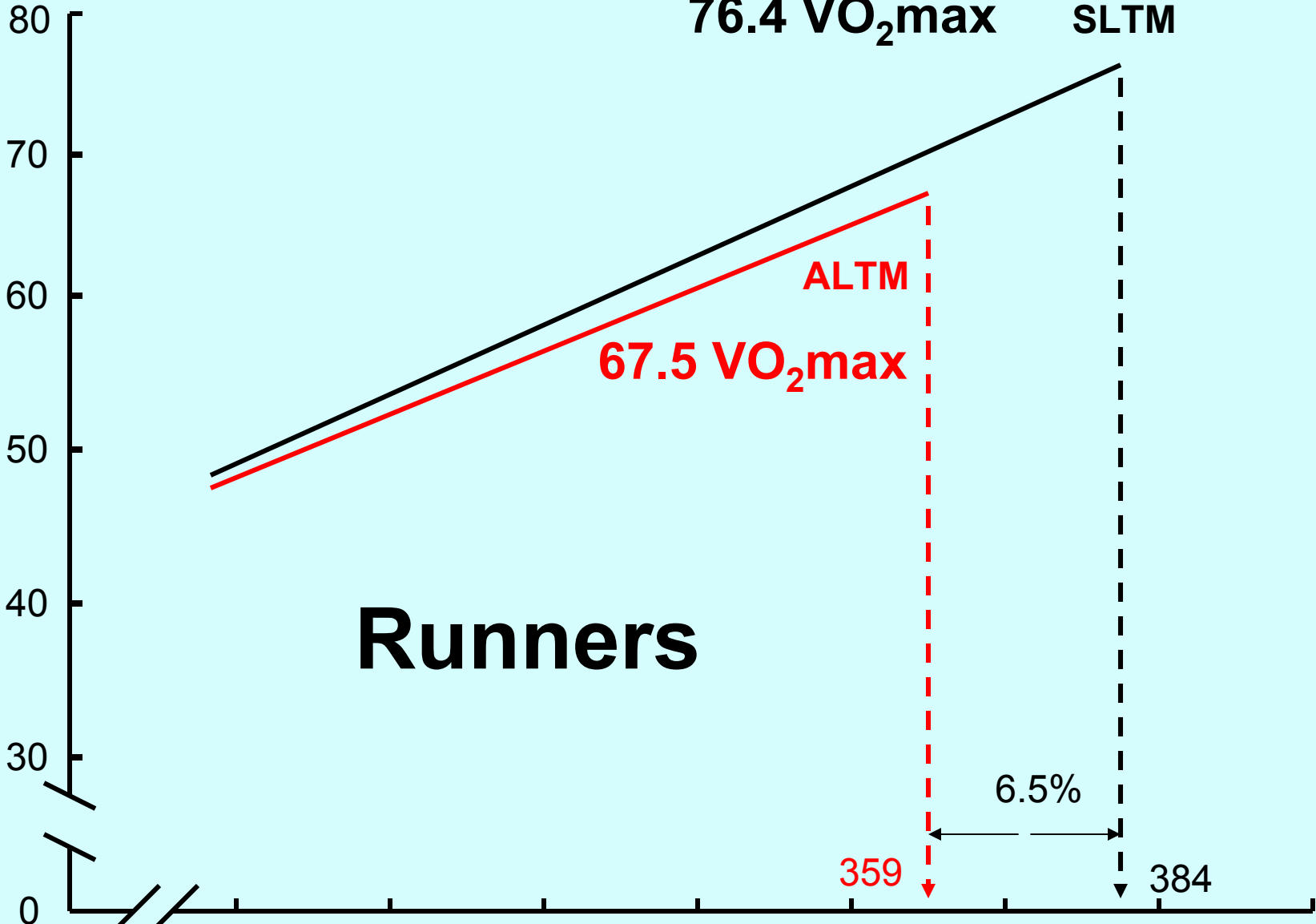
Runners

6.5%

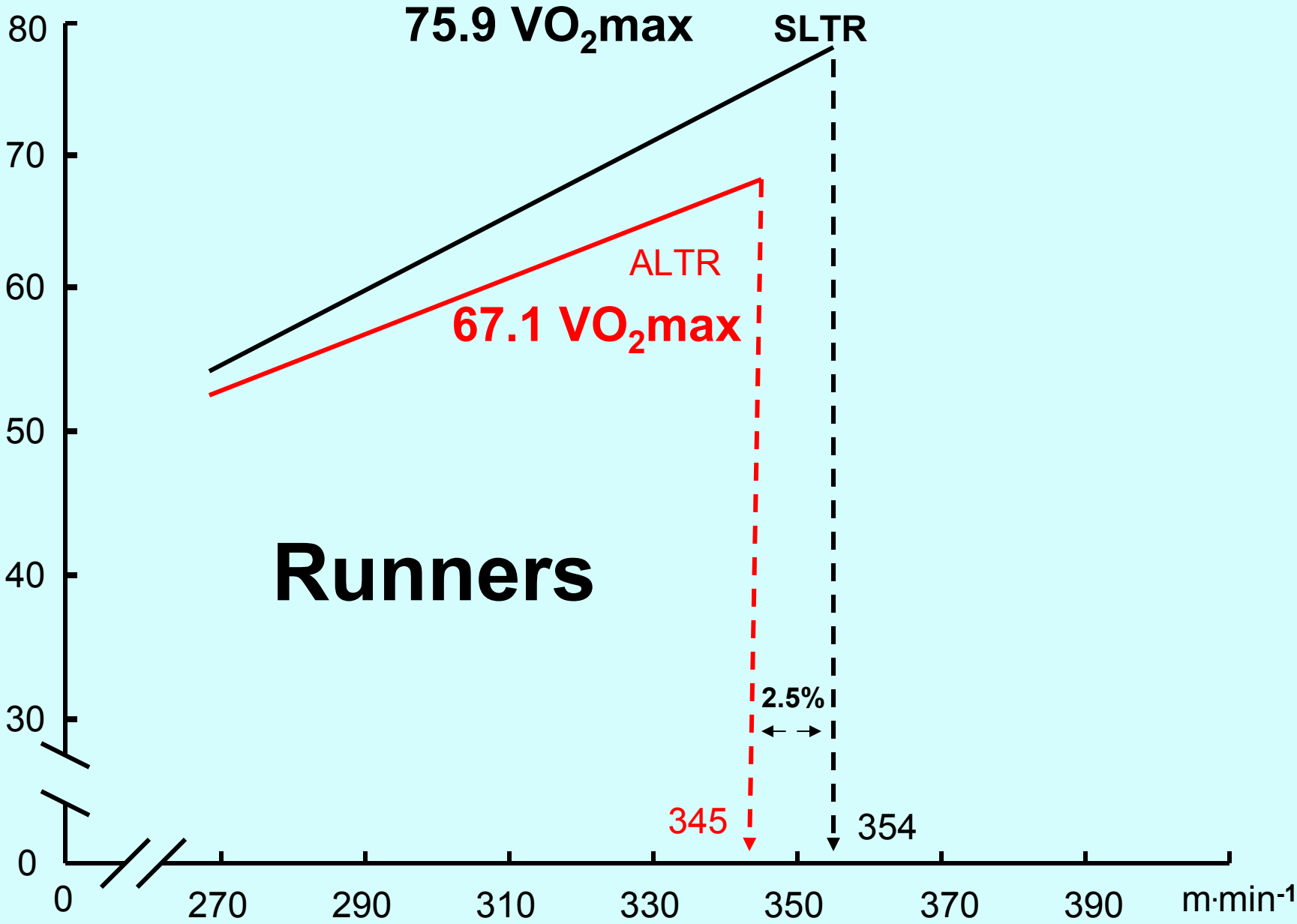
359

384

m·min⁻¹



$\text{VO}_2 \text{ ml}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}$



75.9 VO_2max

SLTR

ALTR

67.1 VO_2max

Runners

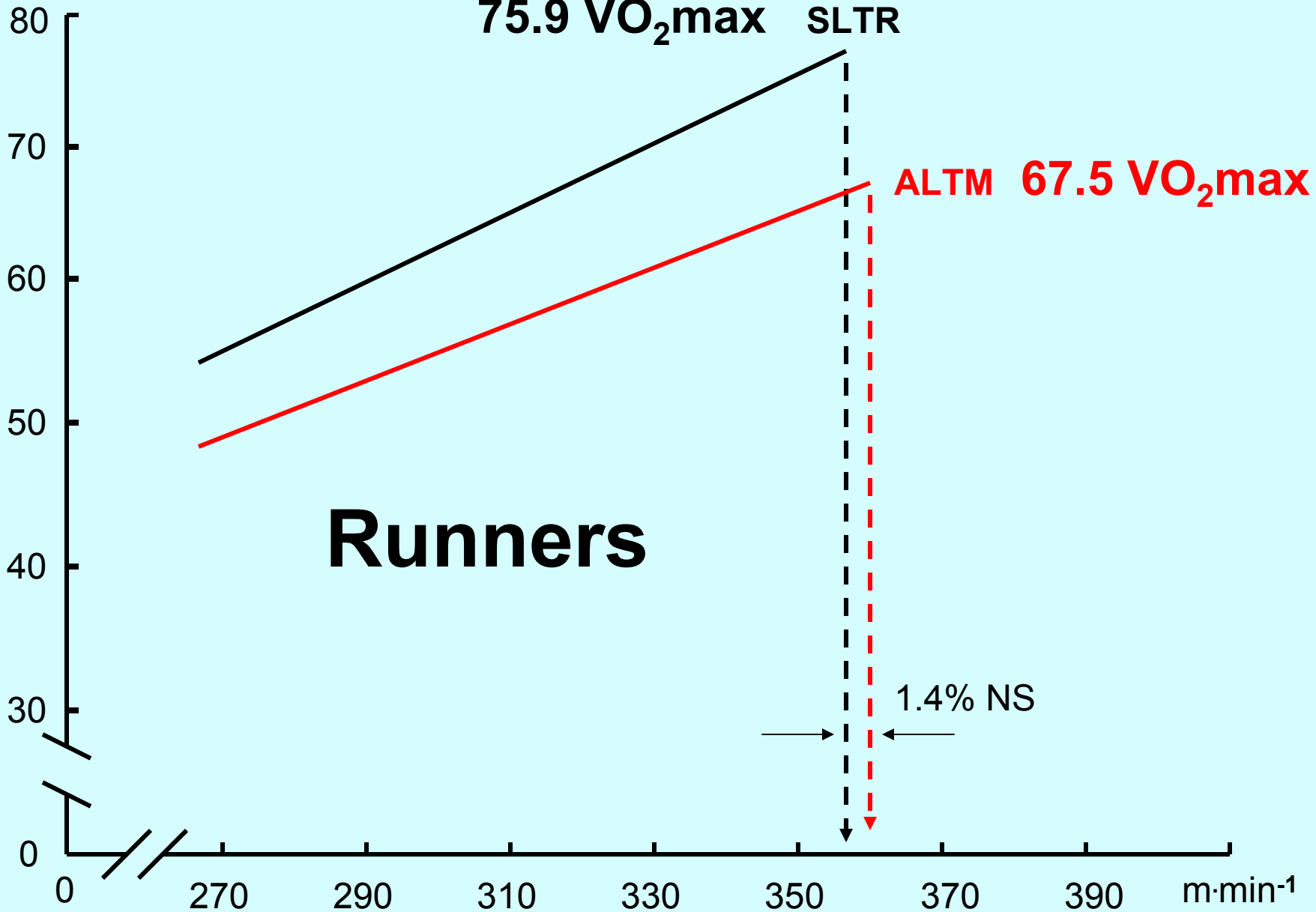
2.5%

345

354

$\text{m}\cdot\text{min}^{-1}$

$\text{VO}_2 \text{ ml}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}$



75.9 VO_2max SLTR

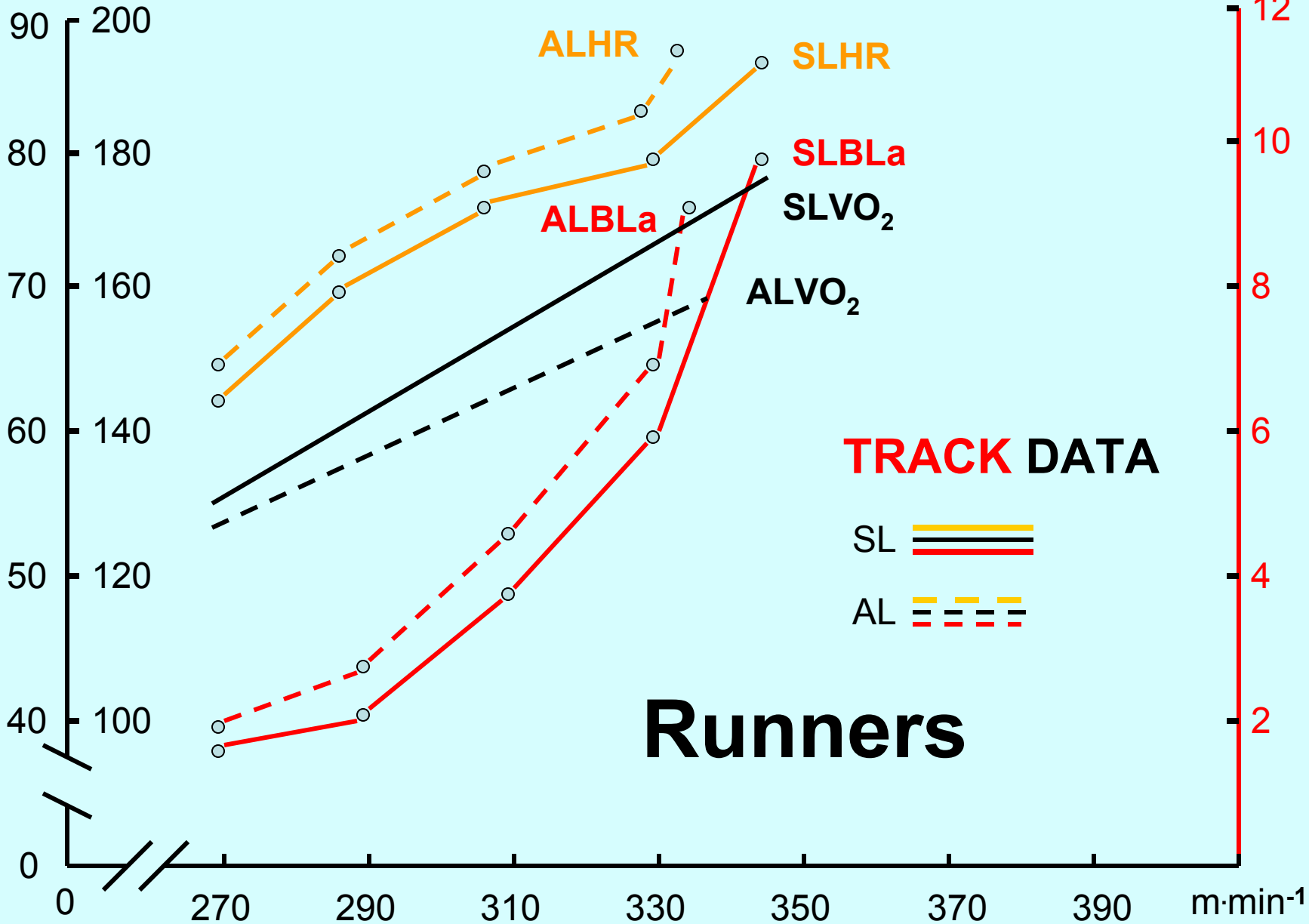
ALTM 67.5 VO_2max

Runners

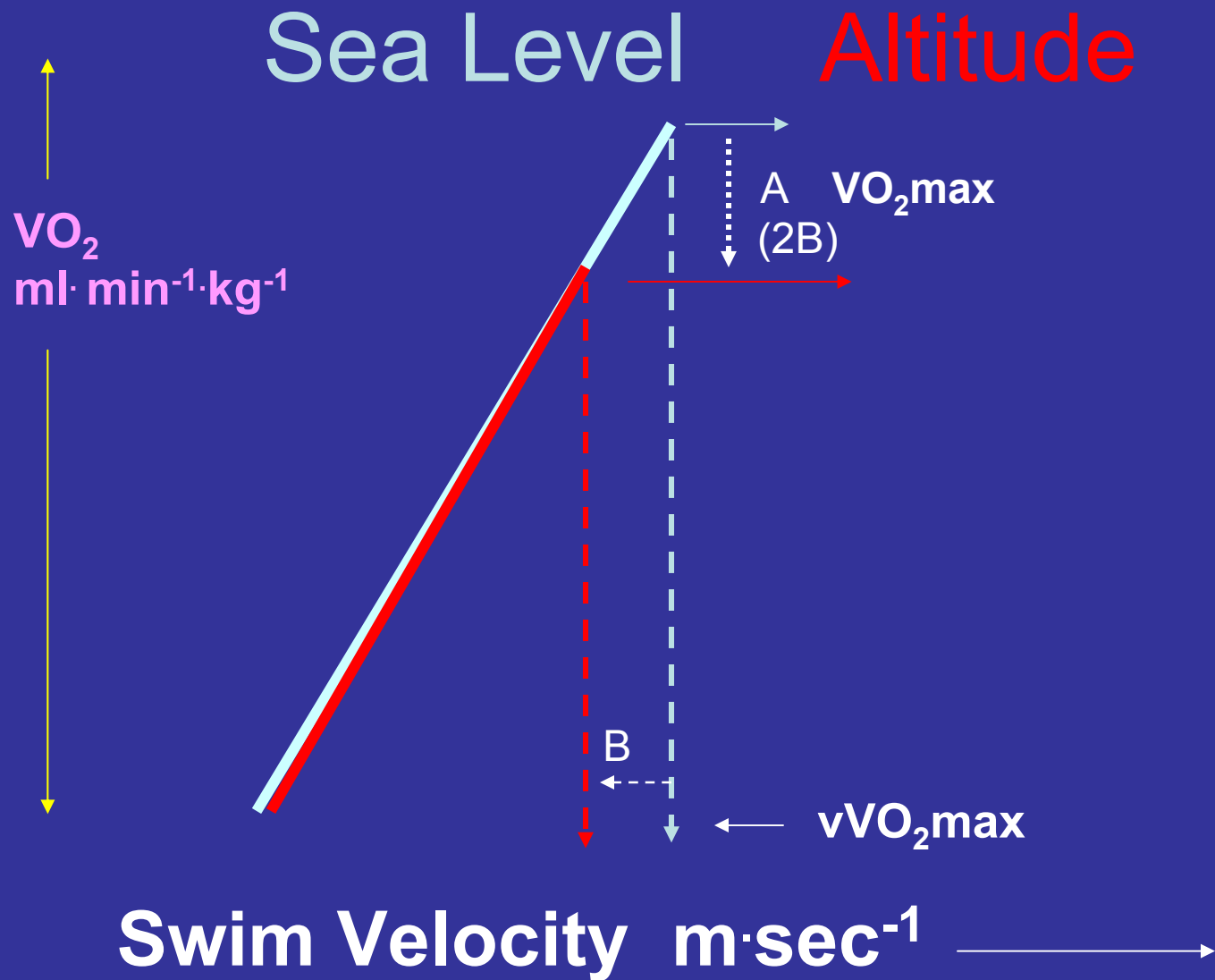
1.4% NS

$\text{m}\cdot\text{min}^{-1}$

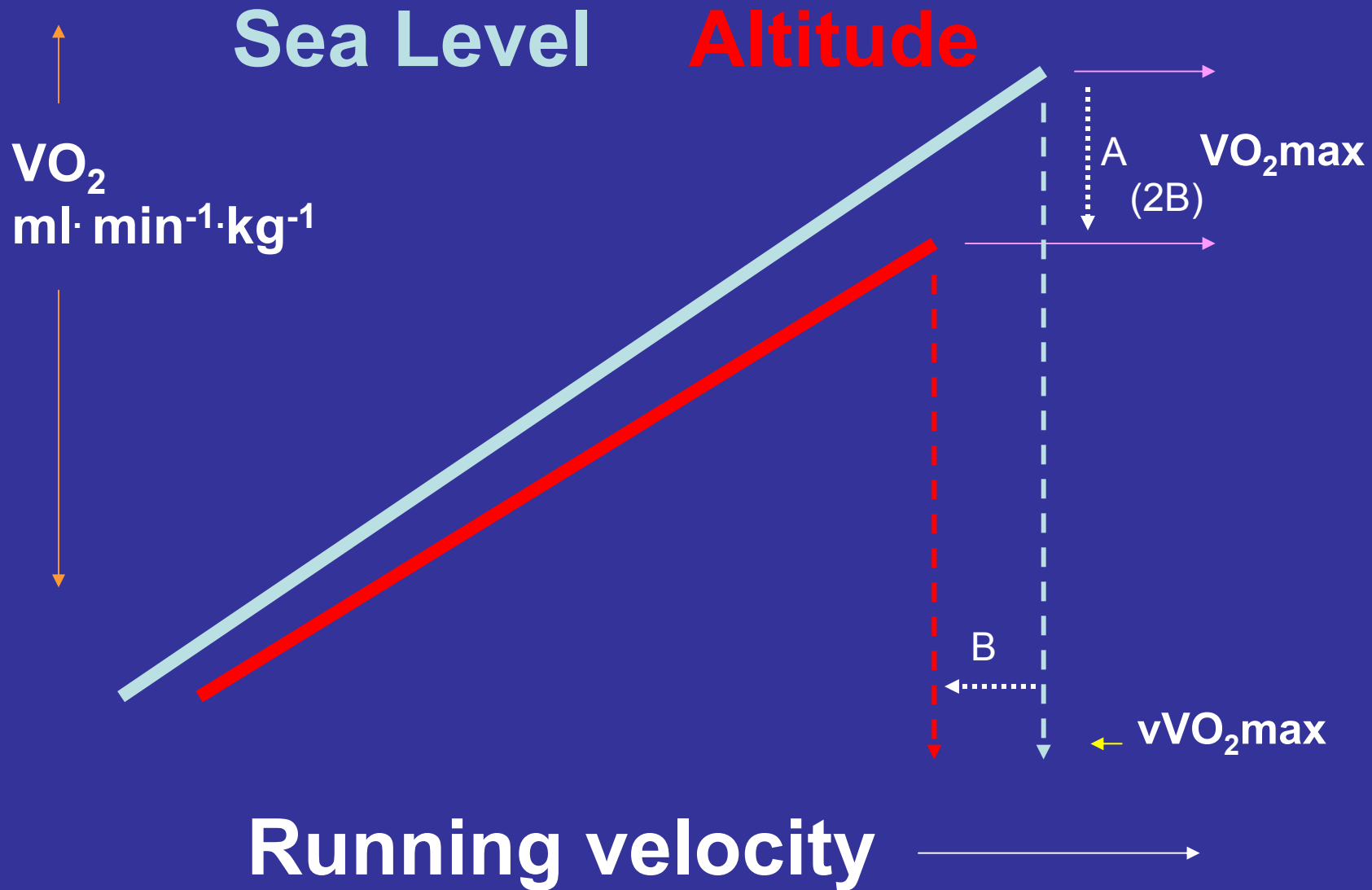
VO₂ ml·min⁻¹·kg⁻¹



Swim Aerobic Profiles



Running Aerobic Profiles

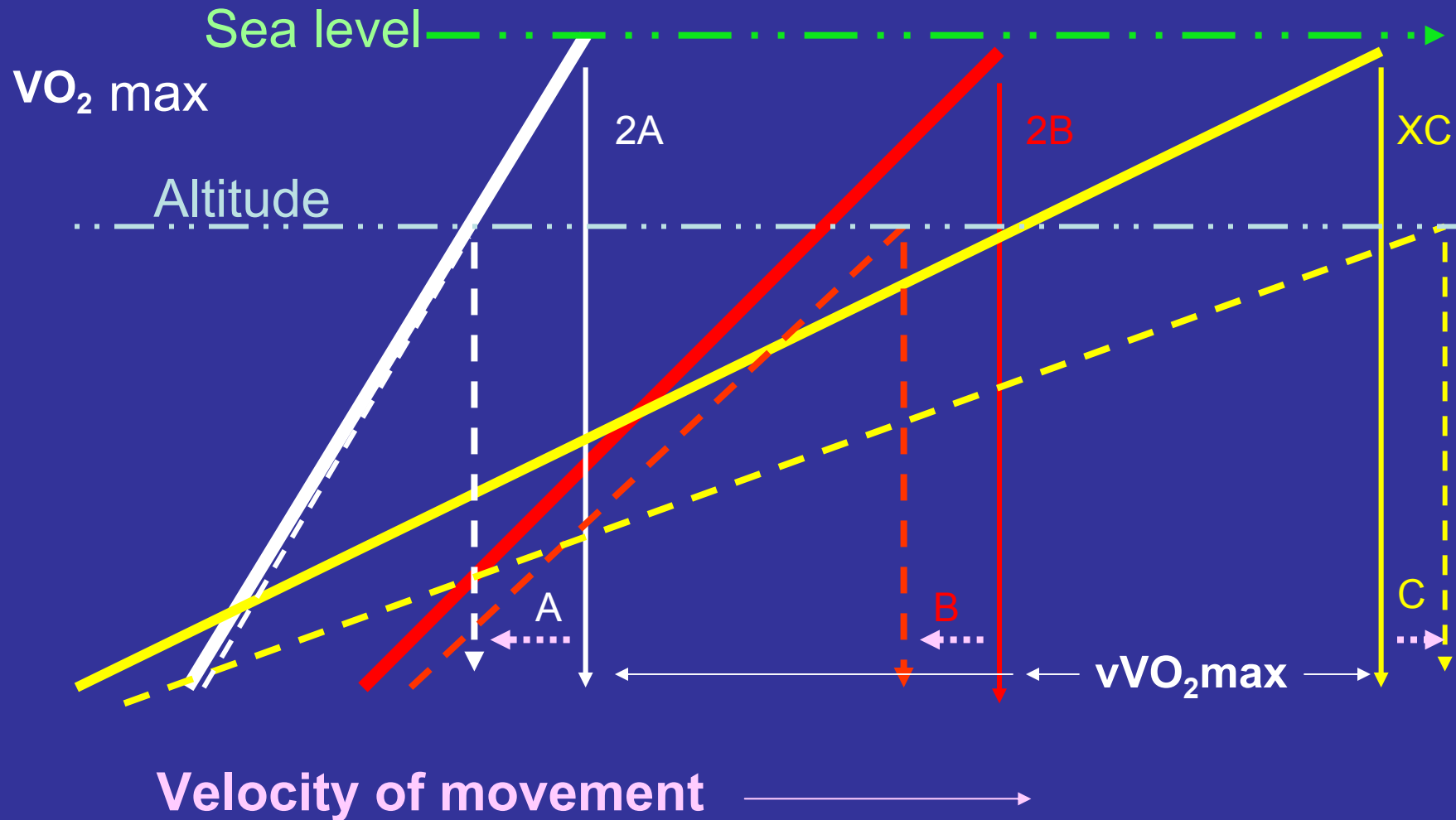


Swim Profile

Bike

Run Profile

Profile



Approaches to AL training

Live and train at AL

Train alternately at AL & SL

Live at AL & train at SL

Live at SL & train at AL

Live and train at SL

Live and train at AL

**Has brought great success
to many altitude natives**

Is it best for everyone?

Alternate training between AL and SL

Has brought success to some

Is it best for everyone?

Live high & train low

Has worked for some

Is it best for everyone?

Live low and train high

**Has been used by a
few**

Is best it for everyone?

Live & train at sea level

Has been & is used by many

Is it good enough?

Ingredients of success

Ability

Motivation

Opportunity

Direction

A little luck

and at a training site --

Good weather

Good housing

Good food

Good training facilities

Good medical support

Community support

Altitude?

How long at altitude?

**I prefer at least 2 weeks
for first exposure;
3 to 6 weeks would be better**

Multiple exposures are best

How long at SL before race?

**Can vary with SL conditions
and duration of the race**

In general, a week + is good

How long do AL benefits last?

Indefinite time