

### Background

Our awareness of the difficulties of racing at altitude increased exponentially during and following the Mexico City Olympics in 1968 when the winning times of mid and long distance races were slower than at the previous games, and athletes, particularly those who did not live at altitude, really struggled to run times that would have been a breeze for them at sea-level.

The hypoxic atmosphere at altitude makes it more difficult for athletes to transport much needed oxygen to the exercising muscles. Each individual responds differently to altitude, and some athletes perform much worse at altitude than their peers, even peers who have had the same previous exposure to altitude. Steeplechaser Kipsiele Koech is an example of an athlete who struggles to race at altitude. He was the world number 1 in both 2004 and 2008, but did not represent his native Kenya at the Olympic Games in either of those years because he struggles so much with the high altitude at which the Kenyan trails are held.

### Top Tips for Racing at altitude

1. Acclimatise - Spend as long as possible at a similar or higher altitude before attempting to race. Some people suggest that if you have to race at altitude but don't have adequate acclimation time, then you should arrive less than 24 hours before your race before the body realises you are at altitude. This is debated however, and others suggest that you should spend as much time as possible at altitude before you race (i.e. that 4 days is better than 3). Those who have been to altitude before may acclimatise quicker. Training at an altitude higher than the one you plan on racing at may help.

2. Lower your expectations - You're going to run slower at altitude than you would at sea level. And it's going to feel more difficult, even if you've had some time to acclimatise. The feeling of satisfaction upon completion, however, will be much greater. The higher the race, the more difficult it will be to replicate your personal best times.

3. Run according to feel rather than pace. Don't expect to be able to hit the same split times as at sea level, so don't even set yourself target split times. The NCAA have set time adjustments for qualification races run at altitude, and Jack Daniels has calculated altitude adjustments for different race durations at different elevations, but remember that each individual responds differently to altitude and these are only estimates. Respect the altitude.

4. Be prepared - Racing at altitude is difficult, even for locals. Make sure that you are well hydrated, have suitable clothing and sun protection, and know the route well. Hydration is very important at altitude, and while you may be able to run a 10km at sea level without taking fluid onboard during the race, this is not advisable at altitude. Make use of all available water and feed stations.

5. Enjoy the atmosphere - Running a race where the outcome is not so important will give you the chance to relax and enjoy the atmosphere. Races like the Great Ethiopian Run are special occasions which should be savoured.

### Some Famous Races at Altitude

**Bolder Boulder** - A well organised 10 km through the streets of Boulder, Colorado at 1,650 m of altitude. Also features a popular international 10km race which starts after the mass participation race. Run on Remembrance Monday, and features a football stadium finish and a relatively flat course. Waves of time-matched runners set off at 2-minute intervals, so little chance of being caught behind slower athletes.

**Great Ethiopian Run** - Popular 10km through the streets of Addis Ababa. Not only do you have altitude to overcome, but you also have high temperatures (30-40 degrees celcius) and 10,000 Other competitions, most of them in party mood, to contend with. The race is held above 2,300m of altitude, and even those who are acclimatised find it difficult. The race is held in late November each year.

**Fluorspar** - though not an official race, this half marathon course is utilised by the Kenyan's as part of their training. The course twists and turns up the side of the rift valley, with no respite from climbing. The reported record is somewhere in the region of 83 minutes!

**Leadville** - Ultra and trail runners have access to a great choice of great races held at altitude, and both are combined in the Leadville 100 Trail, a 100 mile out and back race in the Colorado Rockies, with an elevation variation between 9,200 and 12,600m of altitude. While some of the course is on mountain roads, most of it is of road on forest trails. The race is held in August.

Other competitions include the **Nairobi Marathon** and the **Jungfrau Mountain Marathon** in Switzerland. 2013 sees the introduction of the **Haile Gebrselassie Marathon** in Hawassa, Ethiopia, a race which will be held at 17,00m altitude.

### Interested in finding out more?

Wilber, R. L. *Altitude Training and Athletic Performance*, 2004, published by Human Kinetics  
NCAA, comp. *2010 NCAA Championship Qualifying Time Altitude Adjustments*. N.p.: NCAA.

Daniel, J., 1979, altitude and athletics training and performance, *American Journal of Sports Medicine*, 7, pp371-373

### Comparison of men's athletics winning performances at 1964 and 1968 Olympic Games

	1964 Tokoyo (sealevel)	1968 Mexico City (2,300m Altitude)
<b>5,000m</b>	Bob Schul (USA) 13:48.8	Mohammed Gammoudi (TUN) 14:05.01
<b>10,000m</b>	Billy Mills (USA) 28:24.4 <b>OR</b>	Naftali Temu (KEN) 29:27:40
<b>Marathon</b>	Abebe Bikila (Eth) 2:12:11.2	Mamo Wolde (ETH) 2:20:27
<b>20km Walk</b>	Ken Matthews (GBR) 1:29:34.0	Volodymyr Holubnychy (URS) 1:33:58
<b>50km Walk</b>	Abdon Pamich (Itl) 4:11:12.4	Christoph Höhne (GDR – East Germany) 4:20:14
<b>3,000m S/C</b>		Amos Biwott (KEN) 8:51.02

### Did you know?

The sun's UV rays are much stronger at altitude than at sea level even though the temperatures may be cooler. Always use sunscreen, wear sunglasses and avoid prolonged exposure to the sun.



**Iron levels are also very, very important when training and performing at altitude. Get your haemoglobin and haematocrit levels checked 4-6 weeks before you travel, and ensure that you take iron supplements with you if you think you might not have access to adequate red meat in your diet, or have issues with absorbing iron naturally.**



Because of increased ventilation, increased urinary water loss, and low humidity at altitude, there is a high potential for dehydration. Fluid intake should be increased by as much as 4 litres per day. Morning urine colour should also be monitored to ensure that fluid needs are being met.

