

Running Hot and Cold: the Atlanta and Sydney Summer Olympics

The modern Olympics began on 6 April 1896 in Athens, and so the Atlanta Summer Olympic Games will mark 100 years of the event. The forthcoming Games in Atlanta are likely to be one of the warmest ever held. Only the St Louis Games in 1904 were held in the same average maximum temperatures. Depending upon the event, athletes acclimatised to warmer climates are likely to obtain some relative advantage from the climate in Atlanta. Apart from the athletes competing in the games, the spectators at Atlanta may be affected by the combined relative heat and humidity. Looking forward four years, the Sydney Summer Olympics in September 2000 will be at the other end of the temperature spectrum, with the coolest average maximum temperatures since Amsterdam in 1928. As a result Sydney will have significant advantages over previous locations in terms of spectator comfort and athletic performance.

Physical Influences on Performance

Temperatures, humidity levels, pollution and elevation can have a strong

impact upon the performance and comfort of athletes in particular sports. Sports held in climate controlled indoor arenas, such as swimming, basketball and gymnastics are not greatly affected by climactic influences, nor are sprints, throws and jumps. Sports such as distance running, (especially the marathon), equestrian sports, many team field sports and rowing are markedly affected by the temperature. Athletes and their trainers do allow for acclimatisation to the temperature ranges anticipated for the event, for example the Australian hockey team recently played in Darwin which was viewed as practice for Atlanta. Extended training programs in torrid climates may, however, be counterproductive to performance.

Non climactic influences can also affect an athlete's performance and have a demonstrable effect on the Games. The Mexico City Summer Olympics of 1968 were characterised by the elevation of the location. At 2309m Mexico City is 81m higher than the highest point in Australia, Mount Kosciusko. High altitude train-

ing is now recognised as a valid training strategy, improving athlete's results at lower altitudes. Pollution could also influence performance, and this issue was canvassed prior to the Los Angeles Games in 1984.

This Note compares average temperatures of past Olympic cities with those anticipated for Atlanta and Sydney. Table 1 lists the Summer Olympic Games held since the commencement of the modern Games, along with monthly average maximum and minimum temperatures for the month of Games' opening.ⁱ The elevation of the city above mean sea level is given in metres while the latitude is given in degrees and minutes.ⁱⁱ

Atlanta's Climate in July

The climate for the Olympics in Atlanta in July will be warm and humid. In one hundred years of modern Olympics, only the 1904 St Louis Games commenced in equivalent average maximum temperatures. The average minimum for Atlanta was

Games	Year	Olympic Games City	Opening Date	Max ^{°C}	Min ^{°C}	Elev.m	Latitude
I	1896	Athens	6 April	20	11	107	37° 58'N
II	1900	Paris	20 May	20	10	75	48° 49'N
III	1904	St Louis	1 July	31	22	173	38° 28'N
-	1906	Athens	22 April	20	11	107	37° 58'N
IV	1908	London	27 April	13	6	5	51° 28'N
V	1912	Stockholm	5 May	14	6	44	59° 21'N
VI	1916	Berlin	Cancelled	War			
VII	1920	Antwerp	20 April	14	5	100	50° 48'N
VIII	1924	Paris	4 May	20	10	75	48° 49'N
IX	1928	Amsterdam	17 May	18	8	3	52° 06'N
X	1932	Los Angeles	30 July	27	16	95	34° 03'N
XI	1936	Berlin	1 August	23	13	55	52° 27'N
XII	1940	Tokyo	Cancelled	War			
XIII	1944	London	Cancelled	War			
XIV	1948	London	29 July	22	14	5	51° 28'N
XV	1952	Helsinki	19 July	22	13	46	60° 12'N
XVI	1956	Melbourne	22 November	22	11	35	37° 49'S
XVII	1960	Rome	25 August	30	20	17	41° 54'N
XVIII	1964	Tokyo	10 October	21	13	6	35° 41'N
XIX	1968	Mexico City	12 October	21	10	2309	19° 24'N
XX	1972	Munich	26 August	23	12	524	48° 08'N
XXI	1976	Montreal	17 July	27	14	103	45° 20'N
XXII	1980	Moscow	19 July	23	13	156	55° 45'N
XXIII	1984	Los Angeles	28 July	27	16	95	34° 03'N
XXIV	1988	Seoul	17 September	26	15	87	37° 34'N
XXV	1992	Barcelona	25 July	28	21	93	41° 24'N
XXVI	1996	Atlanta	19 July	31	21	321	33° 45'N
XXVII	2000	Sydney	15 September	19	11	42	33° 52'S

Figure 1: Olympic City Temperatures

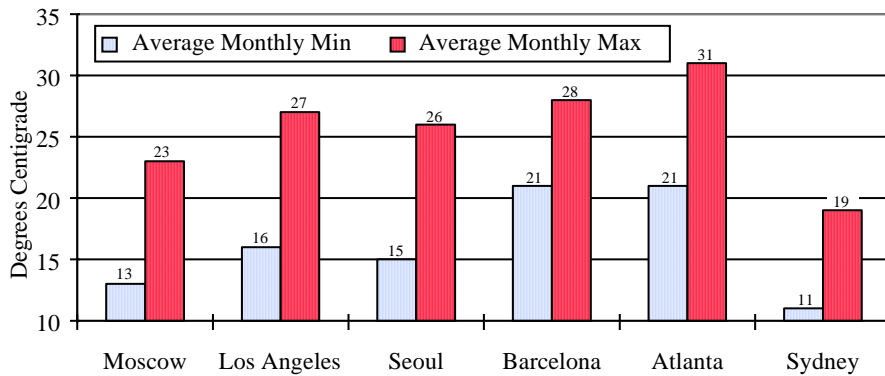
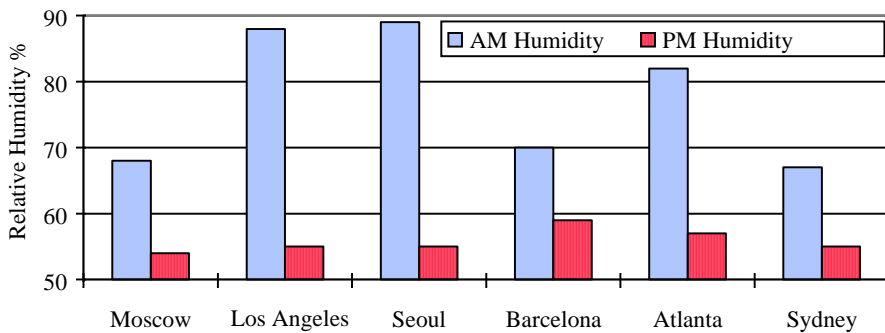


Figure 2: Olympic City Humidity



equalled by Barcelona's average minimum in 1992, but Barcelona's average maximum for the games was somewhat less at 28 degrees Centigrade. Average temperatures in the opening month of the Olympic Games since 1980 are shown in Figure 1; Atlanta is clearly the warmest location.

Humidity combined with high temperatures will adversely affect performances at the Atlanta games. Average afternoon humidity is less than in Barcelona, but the warmer maximum temperatures are likely to result in a greater impact, as air holds more water vapour at higher temperatures. Most people will experience some form of discomfort in Atlanta's climate according to well established Indices of Temperature and Humidity.ⁱⁱⁱ The main biological method of

cooling is perspiration and evaporation which high temperatures and humidity render less effective. While athletic performance is likely to be affected, spectator comfort also needs to be considered. Average morning and afternoon humidity for Olympic cities since 1980 is shown in Figure 2.

Sydney's Climate in September

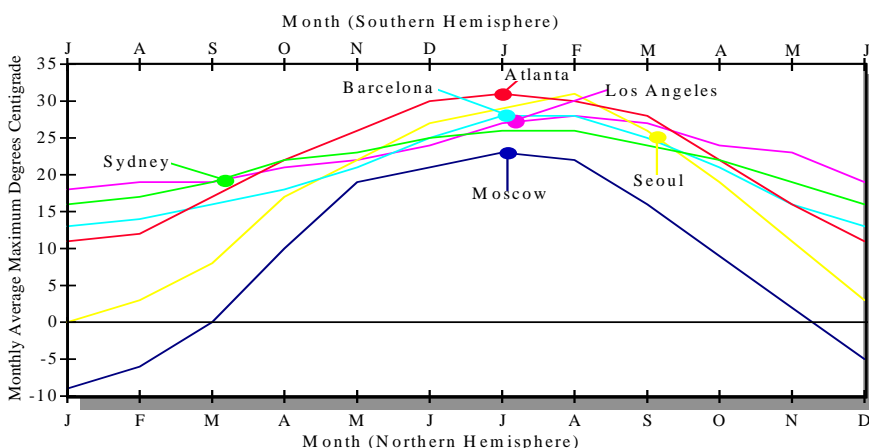
The Sydney Summer Olympics in September 2000 will be held in the lowest average temperatures since the 1928 Amsterdam Olympics. The average monthly minimum temperature for Mexico City at the time of the Games was lower than will be experienced in Sydney, but the Mexico City maximum was somewhat higher. Melbourne in November 1956 also had a minimum of 11 de-

grees Centigrade like Sydney, but a higher average monthly maximum of 22. Even if the games were held in Sydney in high summer, temperatures would be somewhat cooler than those likely for the Atlanta games. Prior to the Second World War a number of Olympics were held in cities with lower temperatures than Sydney (Amsterdam, Antwerp, Stockholm and London) but none since the war.

Figure 3 shows the monthly average maximum temperatures in Sydney, Atlanta, Barcelona, Seoul, Los Angeles and Moscow. Sydney, Barcelona and Los Angeles are notable for their moderated, flat temperature curves and to a lesser degree Atlanta exhibits this type of curve. Moscow is generally cool, but shows a large swing in temperature between winter and summer. Seoul is hot in the summer, but its proximity to the massive Siberian landmass leads to an extremely cold winter. This characteristic is a key difference between most northern hemisphere cities and those in the southern hemisphere. The southern hemisphere is dominated by water (known as the water hemisphere) and temperatures are moderated throughout. The northern hemisphere is dominated by land, leading to massive swings in temperature between summer and winter. Exceptions are those areas with strong maritime influences such as Great Britain.

ⁱ Johnson, The Olympics, Oxmoor House, 1992.
ⁱⁱ Smith & Pearce, World Weather Guide, Times Books, 1984.
ⁱⁱⁱ Ruffner & Bair, The Weather Almanac, Gale Research Company 1981.

Figure 3: Olympic City Climates



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