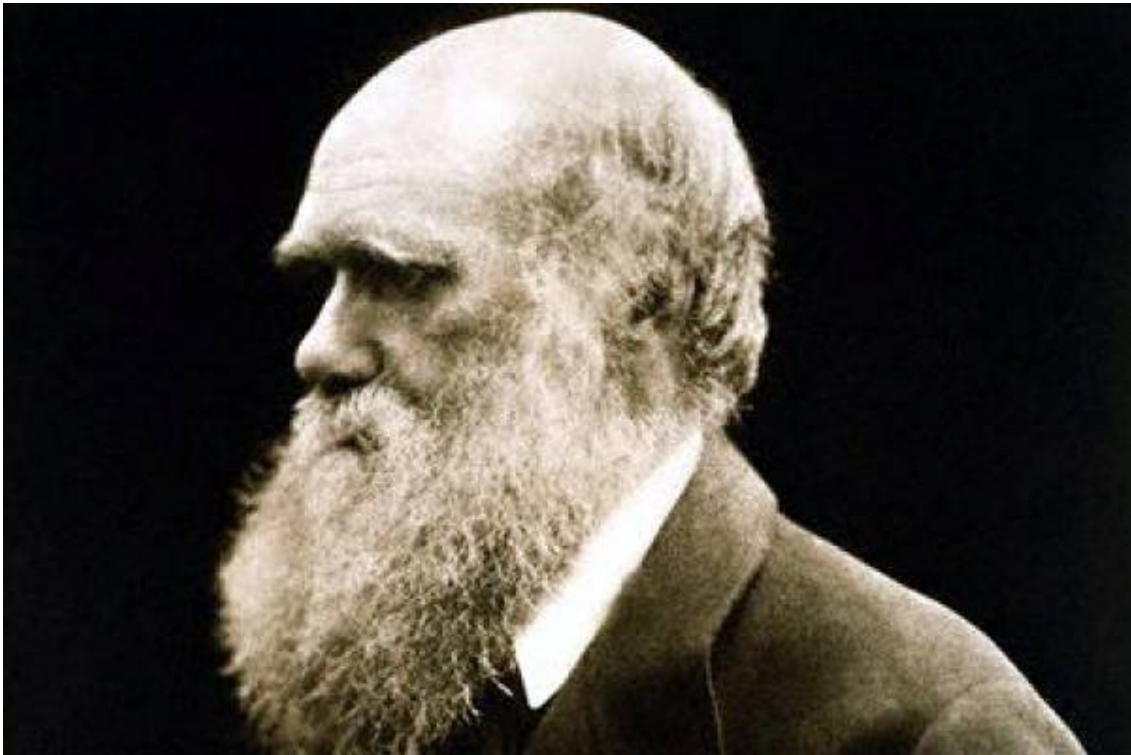
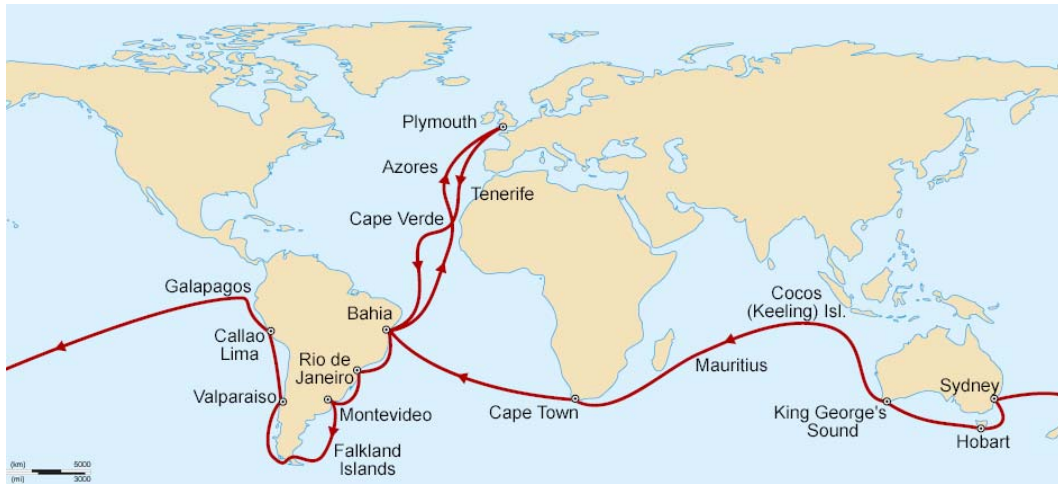


A Tribute to Charles Darwin

By Alexandre Aguiar – MetSul Weather Center (Brazil) and ICECAP contributor



Today, February 12th, marks the bicentennial of the birth of an extraordinary man. Charles Darwin (12 February 1809 – 19 April 1882) observed and proved that species of life have evolved over time from common ancestors, through a process he called natural selection. His theories caused much controversy and still today, in the 21st century, few people refuse to accept them. The author of *Origin of the Species* was much more than a naturalist. His contribution to Science reached also the meteorological field and his notes are useful even in today's global warming debate. Randall Cerveny has an extraordinary and must-read paper on the meteorological observations of Darwin and the importance of them very often neglected by climate experts. Darwin recorded many intriguing meteorological phenomena during the voyage of the H.M.S. *Beagle* around the world from 1831 to 1836. “Unfortunately, the scientific community has, in general, neglected these observations. (..) The latter observations, addressing simultaneous drought occurrence in diverse parts of the world, may be among the first scientific speculations on climate variability and regional teleconnectivity associated with El Niño–Southern Oscillation”, notes professor Cerveny in his paper.



Most of the journey of Charles Darwin took place in South America. During his visits to Uruguay and Argentina, the English naturalist took note of very interesting climate facts and cycles. At this moment, in 2009, Argentina is experiencing of the worst decades in the recent decades. Massive crops failures, near 2 million cattle dead and shortage of water are some of the most dramatic consequences of this severe drought in the beginning of the 21st century. As it is common during these times of climate change hysteria, the recent sequence of years with La Nina and the negative PDO are neglected in favor of the simple and easy discourse of global warming. Darwin observed near 200 years ago as droughts and floods are recurrent in Argentina. It is still today, but global warming is already been appointed as the cause for the today's drought in the Pampas of South America. The scenario described by Darwin in 1833 is frightening and illustrates a catastrophic drought that seems much worse than the one now affecting Argentina.

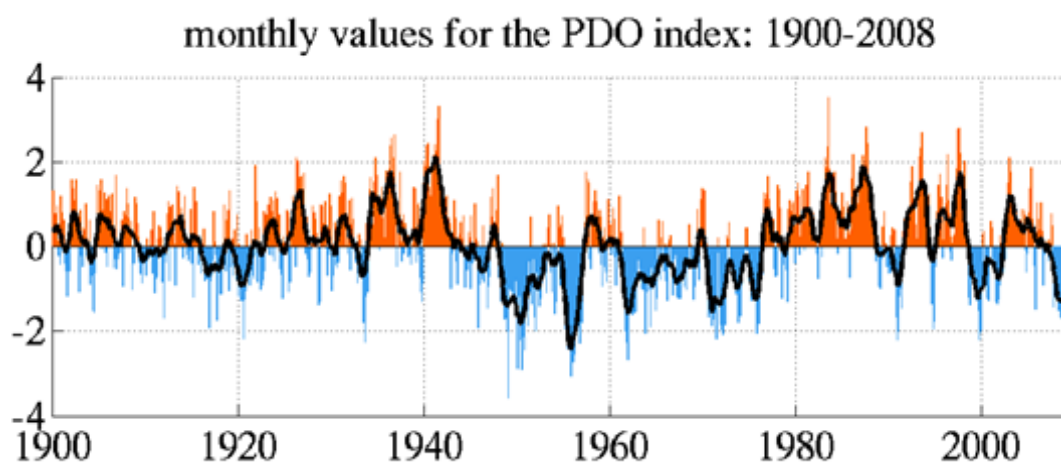
While travelling through the country, I received several vivid descriptions of the effect of a great drought; and the account of this may throw some light on the cases, where vast numbers of animals of all kinds, have been embedded together. The period included between the years 1827 and 1830 is called the "gran seco" or the great drought. During this time, so little rain fell, that the vegetation, even to the thistles, failed; the brooks were dried up, and the whole country assumed the appearance of a dusty high-road. This was especially the case in the northern part of the province of Buenos Ayres, and the southern part of St. Fe. Very great numbers of birds, wild animals, cattle, and horses, perished from the want of food and water.

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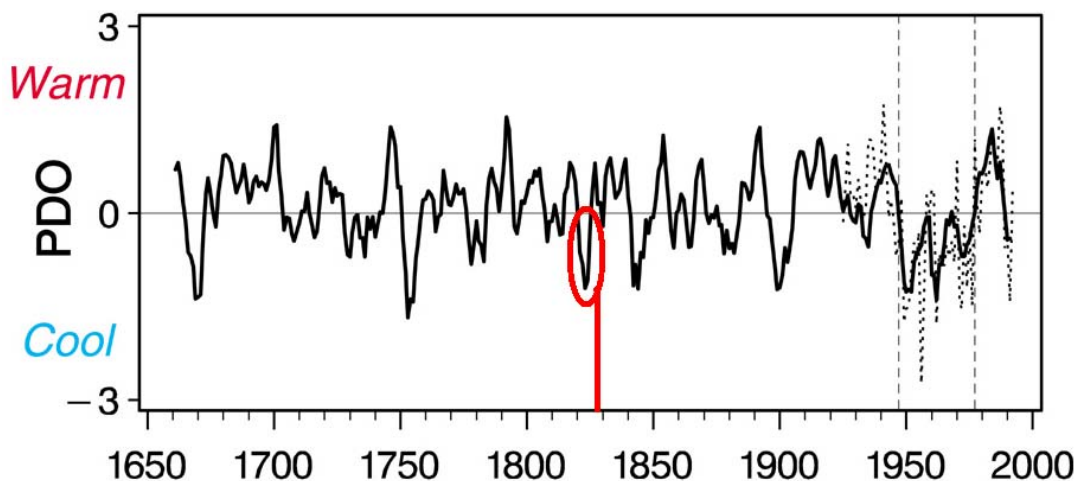
San Pedro is situated in the middle of the finest country; and even now again abounds with animals; yet, during the latter part of the "gran seco," live cattle were brought in vessels for the consumption of the inhabitants. The animals roamed from their estancias, and wandering far to the southward, were mingled together in such multitudes, that a government commission was sent from Buenos Ayres to settle the disputes of the owners. Sir Woodbine Parish informed me of another and very curious source of dispute; the ground being so long dry, such quantities of dust were blown about, that in this open country the landmarks became obliterated, and people could not tell the limits of their estates. I was informed by an eyewitness, that the cattle in herds of thousands rushed into the Parana,* and being exhausted by hunger they were unable to crawl up the muddy banks, and thus were drowned. The arm which runs by San Pedro was so full of putrid carcasses, that the master of a vessel told me, that the smell rendered it quite impossible to pass that way. Without doubt several hundred thousand animals thus perished in the river. Their bodies when putrid floated down the stream, and many in all probability were deposited in the estuary of the Plata. All the small rivers became highly saline, and this caused the death of vast numbers in particular spots; for when an animal drinks of such water it does not recover. I noticed, but probably it was the effect of a gradual increase, rather than of any one period, that the smaller streams in the Pampas were paved with a breccia of bones”.

One of the most important meteorological observations from Darwin in Argentina was the periodic frequency of droughts, a pattern that persists nowadays and it is closely related to the PDO and the ENSO variability. University of Buenos Aires' Professor Eduardo Sierra for many years claim that Argentina experiences dry and wet cycles, related to the PDO, and that a dry period was very probable in the near future, what proven to be true with this current drought.

The current drought in Argentina takes place during one of the longest periods of negative PDO in one hundred years. According to the data from the University of Washington, updated in January 2009, the current period of negative PDO is already 16 months long. Prior to that, since 1900, there were very few periods of the length with consecutive months presenting negative values (20 months from July 1998 to February 2000; 19 months from December 1972 to July 1974; 25 months from July 1970 to July 1972; 28 months from July 1961 to August 1963; 25 months from February 1955 to February 1957). The long period of negative signal of the PDO in the early 60's coincided also with a severe drought in Argentina, particularly in 1963.



It is interesting to note that the massive drought described by Charles Darwin in Argentina coincided with a huge drop in the PDO (Pacific Decadal Oscillation), according to the reconstruction of Biondi et al. (North Pacific Decadal Climate Variability Since AD 1661 *Journal of Climate*, Volume 14, Number 1, pp. 5-10, January 2001)



Many years of weather observation in the Southern Cone of South America teach that years of droughts are frequently followed by extreme rainfall events, mainly associated to the ENSO variability (La Niña to El Niño and vice-versa). In his diary, from May 5th to May 8th, in Maldonado, Charles Darwin took notice of a calamity provoked by rain:

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Sunday 5th-8th During the greater number of these days, there has been torrents of rain & heavy thunder storms. — The whole country is in a state of inundation, even so that many lives have been lost. — the oldest inhabitants have never seen such weather before. — It has necessarily prevented me from making a trip into the country which I had intended to have almost finished by this time. In consequence of these delays & the bad weather I have scarcely been able to set about anything. It anyhow has afforded me some good lessons[317] in being patient & in speaking Spanish. —

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The weather observations from 1833 by Charles Darwin constitute an important warning to the near future. Severe drought not rarely are followed by excessive rain. His notes from 170 years ago in South America, furthermore, reveal the persistence of a climate pattern observed 200 years ago that, despite its recurrence, today is seen as caused by manmade global warming and not Nature following its natural path. Charles Darwin took notice of the periodicity of droughts, but nowadays we are forced to read catastrophic claims that ignore history. Those that doubted you have inherited the wind. We have inherited your knowledge. Thank you Mr. Darwin for your overall scientific contribution ! The last two words of the article belong to you.

A handwritten signature of Charles Darwin in cursive script, written in black ink on a light blue background.