References:

[1] Self et al 1995
"The Atmospheric Impact of the 1991 Mount Pinatubo Eruption"
http://pubs.usgs.gov/pinatubo/self/
[2] Lacis et al 1992 : "Climate Forcing by Stratospheric Aerosols
http://pubs.giss.nasa.gov/docs/1992/1992_Lacis_etal_1.pdf
[3] Hansen et al 1997 "Forcing and Chaos in interannual to decadal climate change"
http://eaps4.mit.edu/research/papers/Hansen_etal_1997b.pdf
[4] Hansen et al 2002 : "Climate forcings in Goddard Institute for Space Studies SI2000 simulations"
http://apollo.eas.gatech.edu/yhw/publications/hansen_etal_2002.pdf
[5] Spencer & Braswell 2011: "On the Misdiagnosis of Surface Temperature Feedbacks from Variations in Earthâ€™ s Radiant Energy Balance"
http://www.mdpi.com/2072-4292/3/8/1603/pdf
[6] Lindzen & Choi 2011: "On the Observational Determination of Climate Sensitivity and Its Implications"
http://www-eaps.mit.edu/faculty/lindzen/236-Lindzen-Choi-2011.pdf
[7] Trenberth et al 2010: "Relationships between tropical sea surface temperature and topâ€ofâ€atmosphere radiation"
http://www.mdpi.com/2072-4292/3/9/2051/pdf
[8] Santer et al 2014: "Volcanic contribution to decadal changes in tropospheric temperature"
http://www.nature.com/ngeo/journal/v7/n3/full/ngeo2098.html
[8b] Supplementary Information:
http://www.nature.com/ngeo/journal/v7/n3/extref/ngeo2098-s1.pdf
[9] Dessler 2010 b â€œA Determination of the Cloud Feedback from Climate Variations over the Past Decadeâ€
http://geotest.tamu.edu/userfiles/216/dessler10b.pdf
[10] Dessler 2011 â€œCloud variations and the Earthâ€™ s energy budgetâ€
http://geotest.tamu.edu/userfiles/216/Dessler2011.pdf
[11]Forster & Gregory 2006
â€œThe Climate Sensitivity and Its Components Diagnosed from Earth Radiation Budget Dataâ€
http://www.image.ucar.edu/idag/Papers/Forster_sensitivity.pdf
[12] Foster and Rahmstorf 2011: "Global temperature evolution 1979-2010"
http://stacks.iop.org/ERL/6/044022
[13] NASA Earth Observatory
http://earthobservatory.nasa.gov/Features/Volcano/
[14] Thompson & Soloman 2008: "Understanding Recent Stratospheric Climate Change"
http://journals.ametsoc.org/doi/abs/10.1175/2008JCLI2482.1
[15] Susan Soloman 2011: "The Persistently Variable â€œBackgroundâ€ Stratospheric Aerosol Layer and Global Climate Change"
http://www.sciencemag.org/content/333/6044/866
[16] Trenberth 2002: "Changes in Tropical Clouds and Radiation"
http://sciencepubs.com/content/296/5576/2095.full.pdf
[17] Douglass & Knox 2005: "Climate forcing by the volcanic eruption of Mount Pinatubo"
http://www.pas.rochester.edu/~douglass/papers/2004GL022119_Pinatubo.pdf
[18] Douglass & Knox 2005b: "Reply to comment by A. Robock on â€˜â€˜Climate forcing by the volcanic eruption of Mount Pinatuboâ€™ â€™ "
http://www.pas.rochester.edu/~douglass/.../reply_Robock_2005GL023829.pdf

Data sources:

[DS1] AOD data: NASA GISS
http://data.giss.nasa.gov/modelforce/strataer
Derived from SAGE (Stratospheric Aerosol and Gas Experiment) instrument.
"The estimated uncertainty of the optical depth in our multiple wavelength retrievals [Lacis et al., 2000] using SAGE observations is typically several percent. "[4]

[DS2] ERBE TOA data: Earth Radiation Budget Experiment
http://eosweb.larc.nasa.gov/sites/default/files/project/erbe/edition3_rev1/Edition3_Rev1_wfov_sf_monthly_tropics.txt
data description:
https://eosweb.larc.nasa.gov/sites/default/files/project/erbe/quality_summaries/s10n_wfov/erbe_s10n_wfov_nf_sf_erbs_edition3.pdf

[*] **Explanatory notes:**
Negative feedback is an engineering term that refers to a reaction that opposes its cause. It is not a value judgement about whether it is good or bad. In fact, negative feedbacks are essential in keeping a system stable. Positive feedbacks lead to instability and are thus generally "bad".
Convolution is a mathematical process that is used, amongst other things, to implement digital filters. A relaxation response can be implemented by convolution with an exponential function. This can be regarded as an asymmetric filter with a non-linear phase response. It produces a delay relative to the input and alters it's shape.
Regression dilution refers to the reduction in the slope estimations produced by least squares regression when there is significant error or noise in the x-variable. Under negligible x-errors OLS regression can be shown to produce the best unbiased linear estimation of the slope. However, this essential condition is often over-looked or ignored, leading to erroneously low estimations of the relationship between two quantities. This is explained in more detail here:
http://climategrog.wordpress.com/2014/03/08/on-inappropriate-use-of-ols/

Supplementary Information
Detailed method description.
The break of four months in the ERBE data at the end of 1993 was filled with the anomaly mean for the period to provide a continuous series. This truncates what would have probably been a small peak in the data, marginally lowering the local average, but since this was not the primary period of interest this short defect was considered acceptable.
The regression was performed for a range of time-constants from 1 to 24 months. The period for the regression was from just before the eruption, up to 1994.7, when AOD had subsided and the magnitude of the annual cycle was found to change, indicating the end of the initial climatic response (as determined from the adaptive anomaly shown in figure 2).
Once the scaling factor was obtained by linear regression for each value of tau, the values were checked for regression dilution by examining the correlation of the residual of the fit with the AOD regressor while varying the value of VF in the vicinity of the fitted value. This was found to give a regular curve with a minimum correlation that was very close to the fitted value. It was concluded that the least squares regression results were an accurate estimation of the presumed linear relationship.
The low values of time-constant resulted in very high values of VF (eg. 154 for tau=1 month) that were physically unrealistic and way out side the range of credible values. This effectively swamps the TOA anomaly term and is not meaningful.
tau = 6 months gave VF = 54 and this was taken as the lower limit for the range time constant to be considered.
The two free parameters of the regression calculations will ensure an approximate fit of the two curves for each value of the time constant. The latter could then be varied to find the response that best fitted the initial rise after the eruption, the peak and the fall-off during 1993-1995.
This presented a problem since, even with adaptive anomaly approach, there remains a significant, roughly cyclic, six month sub-annual variability that approaches in magnitude the climate response of interest. This may be at least in part a result aliasing of the diurnal signal to a period close to six months in the monthly ERBE data as pointed out by Trenberth [16]. The relative magnitude of the two also varies depending on the time-constant used, making a simple correlation test unhelpful in determining the best correlation with respect to the inter-annual variability. For this reason it could not be included as a regression variable.
Also the initial perturbation and the response, rise very quickly from zero to maximum in about two months. This means that low-pass filtering to remove the 6 month signal will also attenuate the initial part of the effect under investigation. For this reason a light gaussian filter (sigma = 2 months) was used. This has 50% attenuation at 2.3 months. comparable to a 4 month running mean filter (without the destructive

distortions of the latter). This allowed a direct comparison of the rise, duration of the peak and rate of fall-off in the tail that is determined by the value of the time-constant parameter, and thus the value producing the best match to the climate response.

Due to the relatively course granularity of monthly data that limits the choice of the time-constant values, it was possible to determine a single value that produced the best match between the two variables.

The whole process was repeated with and without subtraction of the oscillatory, pre-eruption variability to determine the effects of this adjustment.

The uncertainty values given are those of the fitting process and reflect the variability of the data. They do not account for the experimental uncertainty in interpreting the satellite data.