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^{36}Cl bomb peak: comparison of modeled and measured data

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Abstract. The extensive nuclear bomb testing of the fifties and sixties and the final tests in the seventies caused a strong ^{36}Cl peak that has been observed in ice cores world-wide. The measured ^{36}Cl deposition fluxes in eight ice cores (Dye3, Fiescherhorn, Grenzgletscher, Guliya, Huascarán, North GRIP, Inylchek (Tien Shan) and Berkner Island) were compared with an ECHAM5-HAM general circulation model simulation (1952–1972). We find a good agreement between the measured and the modeled ^{36}Cl fluxes assuming that the bomb test produced global ^{36}Cl input was ~80 kg. The model simulation indicates that the fallout of the bomb test produced ^{36}Cl is largest in the subtropics and mid-latitudes due to the strong stratosphere-troposphere exchange. In Greenland the ^{36}Cl bomb signal is quite large due to the relatively high precipitation rate. In Antarctica the ^{36}Cl bomb peak is small but is visible even in the driest areas. The model suggests that the large bomb tests in the Northern Hemisphere are visible around the globe but the later (end of sixties and early seventies) smaller tests in the Southern Hemisphere are much less visible in the Northern Hemisphere. The question of how rapidly and to what extent the bomb produced ^{36}Cl is mixed between the hemispheres depends on the season of the bomb test. The model results give an estimate of the amplitude of the bomb peak around the globe.

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