IPCC Model Output Data Set Size

For monthly data a total of about 2080 years will be generated in performing a single "realization" of the experiments listed in Appendix A (assuming that a present-day control is unneccessary). Ocean data won't be collected for the slab ocean experiments or AMIP (other than SST), so the total will be about 1860 years for the ocean.

The following table provides information needed to calculate the size of a dataset produced by a single model (assuming only a single control run simulation of 500 years, and neglecting annual fields, flux-correction fields, fixed fields, zonally averaged fields, and the lower priority fields)

Table 1: Data for Estimating Data Set Size

	First Member of Ensemble				**Additional Members of Ensemble**		
	Atmosphere			**Ocean**	**Atmosphere**		**Ocean**
	monthly	*daily*	*3-hourly*	*monthly*	*monthly*	*daily*	*monthly*
years	2180	420	32	1960	1480	360	1260
samples/yr	12	~365	~2920	12	12	~365	12
total samples (N)	26160	153300	93440	23520	17760	131400	15120
2-d fields	44	14	9	8	44	4	8
3-d fields	9	4	0	6	9	0	0
levels	17	9	0	33	17	0	0
total equivalent 2-d fields (Eq2d)	197	50	9	206	197	4	8
4*Eq2d*N (10^6 bytes/grid-cell)	20.6	30.7	3.4	19.4	14.0	2.1	0.5
number of grid-cells (T85 atmos., 1x1 degree ocean	32768	32768	32768	64800	32768	32768	64800
size (10^9 bytes)	675	1006	111	1257	459	69	32

In the following table the total size of a dataset is estimated as follows:

A-cells*54.7 + O-cells*19.4 + Ens*(A-cells*16.1 + O-cells*0.5)
where A-cells = number of atmospheric grid cells
O-cells = number of ocean grid cells
Ens = ensemble size

Table 2: Estimate of Dataset Size for Several Models

Model	**First Member of Ensemble** (10^6 bytes/grid-cell)		**Additional Members of Ensemble** (10^6 bytes/grid-cell)		**# of grid-cells**		**ensemble size**	**size (10^{12} bytes)**
	Atmosphere	**Ocean**	**Atmosphere**	**Ocean**	**Atmosphere**	**Ocean**		
1x1 degree sample	54.7	19.4	16.1	0.5	360x180	360x180	4	8.0
NCAR	54.7	19.4	16.1	0.5	256x128	360x180	5	5.3
GFDL	54.7	19.4	0	0	144x90	360x200	1	2.1
MFRSGC hi-resol. model	13.6	4.9	0	0	320x160	320x320	1	1.2
MFRSGC med-resol. model	54.7	19.4	16.1	0.5	128x64	256x192	3	1.7

The average contribution per group for the 3 groups listed above is 3.4 terrabytes. If this is typical, then when can accommodate at least 11 groups on our 40 Tbyte RAID system.

Appendix A

The following table indicates for each IPCC simulation the years for which output should be submitted to the PCMDI archive.

Table of Experiments.

	Experiment Name	**Monthly Data and Yearly Data (Extremes Indices)** (submit for each member of ensemble)	**Daily Data** (temperature and precipitation data should be submitted for each member of ensemble, but all other fields should be submitted for only a single ensemble member)	**3-Hourly Data** (submit for a single ensemble member)	**Notes**
1	pre-industrial control experiment	> 100 years (~500 years)	40 years that can best be compared to years 1961-2000 of the 20C3M expt.	last year of reported daily data (i.e., corresponding to year 2000 of the 20C3M expt.)	control for experiments 3-7 and for some models also the control for experiments 8-9. There will be no anthropogenic or natural forcing in this control. The control experiment should be long enough to extend to the furthest point in time reached by the end of the perturbation experiments (which presumably branch from it). Thus the control should allow us to subtract any residual, unforced drift from all perturbation simulations.
2	present-day control experiment	> 100 years (~300 years)	last 20 years	last year	for most models this experiment is not needed, but for some it is the control for experiments 8-9. There will be no natural forcing and anthropogenic influences will be set at present-day level. The control experiment should be long enough to extend to the furthest point in time reached by the end of the perturbation experiments (which branch from it). Thus the control should allow us to subtract any residual, unforced drift from the perturbation simulations.
3	climate of the 20th Century experiment (20C3M)	~1850 - present	1961 - 2000	1991-2000	should initialize from a point early enough in the pre-industrial control run to ensure that the end of all the perturbed runs branching from the end of this 20C3M run end before the end of the control. This will enable us to subtract any residual drift in the control from all runs that

					will be compared to it.
4	committed climate change experiment	present - 2100	2046-2065, 2081 - 2100	2050, 2100	should take the end of the 20C3M run as its initial condition.
5	SRES A2 experiment	present - 2100	2046 - 2065, 2081 - 2100	2050, 2100	should take the end of the 20C3M run as its initial condition.
6	720 ppm stabilization experiment (SRES A1B)	present - 2300 (present - 2200)	2046 - 2065, 2081-2100, 2181-2200, 2281-2300	2050, 2100, 2150, 2200, 2300	Impose SRES A1B conditions and initialize with conditions from the end of the 20C3M simulation and run to 2100, after which hold concentrations fixed and continue run to 2200. One member of the ensemble should be extended for an additional 100 years (to 2300), continuing to hold concentrations fixed.
7	550 ppm stabilization experiment (SRES B1)	present - 2200 (present - 2200)	2046 - 2065, 2081-2100, 2181-2200, 2281-2300	2050, 2100, 2150, 2200, 2300	Impose SRES B1 conditions and initialize with conditions from the end of the 20C3M simulation and run to 2100, after which hold concentrations fixed and continue run to 2200. One member of the ensemble should be extended for an additional 100 years (to 2300), continuing to hold concentrations fixed.
8	1%/year CO2 increase experiment (to doubling)	~70 years to doubling + an additional 150 years	last 20 years	at doubling and 150 years after doubling	Hold CO2 fixed after reaching doubled concentration. This run should be initialized from a point either within a present-day control run or a pre-industrial control run. Make sure that the initial time is early enough in the control run to subtract out any residual (unforced) drift that might occur over the 220 years of this experiment.
9	1%/year CO2 increase experiment (to quadrupling)	~140 years to quadrupling + an additional 150 years	last 20 years	at quadrupling and 150 years after quadrupling	Hold CO2 fixed after reaching quadrupled concentration. This run should be initialized from a point either within a pre-industrial control run or a present-day control run. Make sure that the initial time is early enough in the control run to subtract out any residual (unforced) drift that might occur over the 290 years of this experiment.
10	slab ocean control experiment	~100 years??	last 20 years	last year	slab ocean control for experiment 11. Be sure to run long enough to reach a true equilibrium state and to produce stable statistics (at least 20 years beyond equilibrium).

11	2xCO2 equilibrium experiment	~100 years??	last 20 years	last year	slab ocean experiment with an instantaneous doubling. There is interest in the transient response to the instantaneous doubling, so please report all years and be sure to run long enough to reach a true equilibrium state and to produce stable statistics (at least 20 years beyond equilibrium).
12	AMIP simulation	1979 - present	all years	2000	atmospheric component should be identical to that used in the above experiments

In addition, IPCC requests that OMIP and CFMIP experiments be performed.