DR. SOLOMON: THANKS TO ALL THE SPEAKERS. 12 DR. SPINRAD: EXCUSE ME. SUSAN SOLOMON, 13 WOULD YOU PLEASE INTRODUCE YOURSELF FOR THE RECORD. 14 (LAUGHTER) 15 DR. SOLOMON: THANKS FOR INTRODUCING ME, 16 RICK. 17 I'M SUSAN SOLOMON. I'M AT THE NOAA EARTH 18 SYSTEM RESEARCH LAB IN BOULDER, COLORADO. 19 I THOUGHT THE TALKS WERE GREAT. 20 I THINK ONE OF THE POINTS THAT MARTIN 21 PARTICULARLY EMPHASIZED, WHICH DESERVES A LITTLE BIT 22 OF REINFORCING IS THE INFLUENCE OF CARBON CYCLE 23 FEEDBACK ON MITIGATION STRATEGIES. I MEAN, I THINK 24 THAT WHEN YOU REALLY LOOK AT THE ISSUE OF HOW MUCH 25 CARBON CAN WE EMIT, HOW MUCH CAN WE AFFORD TO EMIT, 0133 THE FACT THAT IF YOU WANT TO STABILIZE AT 450 CO2 AND 1 2 YOU INCLUDE CARBON CYCLE FEEDBACK, A MID RANGE OF 3 AVAILABLE MODELS WOULD SAY THAT INSTEAD OF 4 670 GIGATONS OF CARBON THAT YOU CAN AFFORD TO EMIT IN 5 THE COMING CENTURY, YOU HAVE TO EMIT MAYBE 490 AS A MID RANGE VALUE. IT IS AN ESSENTIAL POINT FOR 6 7 MITIGATION. SO I THINK THE QUESTION THAT I WOULD LIKE 8 9 TO POSE RELATES TO THE RESEARCH NEED RELATING TO 10 THAT. WHAT WILL IT TAKE TO ACTUALLY KNOW HOW MUCH 11 MORE CARBON WE CAN AFFORD TO EMIT? WHAT WILL IT TAKE TO BETTER QUANTIFY THE CARBON CYCLE FEEDBACK? 12 YOU ALL KIND OF TOUCHED ON IT; BUT, YOU 13 14 KNOW, THE RANGE ACROSS MODELS IS LARGE, AS YOU HAVE 15 ALSO EMPHASIZED. I THINK THE NUMBER IS SOMEWHERE 16 BETWEEN 375 AND 600 GIGATONS, DEPENDING ON THE HADLEY CENTRE MODEL AND THE MPI MODEL. 17 DO YOU THINK THAT WE CAN DESIGN A BETTER 18 19 RESEARCH STRATEGY TO GO AFTER THAT IN THE NEAR TERM? DR. HEIMANN: I THINK THIS IS, OF COURSE, A 2.0 VERY IMPORTANT QUESTION, AND I THINK THAT THE 21 22 OBSERVATION STRATEGY REALLY SHOULD HELP. I MEAN, WE LOOKED AT HERE, AND I THINK PRESENTLY THE INFORMATION 23 24 IS SORT OF LOOKING AT THE GLOBAL TOTALS ONLY. I 25 THINK WITH THE REGIONAL INFORMATION WHICH WE NOW HAVE 0134 AND THE ACCUMULATING, WITH ALL THESE PROGRAMS, I 1 2 THINK THE INFORMATION THAT WE HAVE PRESENTED LATELY 3 IN CONJUNCTION WITH THE CARBON CYCLE, I THINK THIS 4 PIECE OF INFORMATION IS VERY CRUCIAL TO EVALUATE 5 THESE MODELS AND TO ALSO REFUTE SOME OF THEM. I THINK THIS IS AT LEAST ONE WAY ONE SHOULD REALLY LOOK 6 7 AT IT IN MUCH MORE DETAIL THAN HAS BEEN DONE UP TILL 8 NOW. 9 DR. TANS: I AGREE WITH THAT. I MEAN, THE 10 SYSTEM NEEDS TO BE DEVELOPED IN A WAY THAT YOU CAN 11 QUANTIFY OBJECTIVELY REGIONAL STORES AND SINKS SO 12 THEN THEY CAN BE LINKED WITH PROCESSES THAT ARE 13 ONGOING AT THE SAME TIME AND WHICH PRESUMABLY ARE 14 ALSO BEING OBSERVED. 15 WHAT WE HAVE SHOWN MOSTLY IS TOO GLOBAL AND

TOO LARGE SCALE TO PUT OUR FINGER ON SPECIFIC CAUSES. 16 17 MR. RALPH KEELING: I WOULD EMPHASIZE THAT 18 THE MOST IMPORTANT TEST FOR THESE MODELS ARE THE 19 EXISTING RECORDS OF ATMOSPHERIC CO2, NOT JUST MAUNA 2.0 LOA BUT GLOBALLY, AND THE ABILITY TO GO BACK AND LOOK 21 AT THEM IN GREATER DETAIL AND TO SIFT THROUGH 22 SYSTEMATIC ERRORS, A POINT I MADE IN MY TALK, IS 23 ABSOLUTELY AT THE CUTTING EDGE OF THIS. 24 I WOULD ALSO POINT OUT THAT THE EMPHASIS ON 25 FEEDBACKS, I THINK, HAS BEEN UNDERPLAYED IN THE 0135 1 PLANNING PROCESS WITHIN THE AGENCIES. FOR EXAMPLE, 2 EVEN THE EMPHASIS ON NORTH AMERICA CARBON I THINK HAS 3 LED TO AN EMPHASIS ON TRACKING EXISTING FLUXES RIGHT 4 NOW IN SPECIFIC AREAS, AND IT HAS PROBABLY, TO SOME 5 EXTENT, DISCOURAGED INVESTIGATORS FOR TAKING A GLOBAL 6 VIEW OF THIS PROBLEM, BECAUSE AFTER ALL IT IS THE 7 TUNDRA IN SIBERIA THAT FEEDS BACK, SAY, TO CAUSE THE 8 RAPID INCREASE. SHOULDN'T WE, IN THE U.S., CARE AS 9 MUCH ABOUT THAT AS THE SOILS IN CANADA THAT ACTUALLY 10 HAVE LESS CARBON IN THEM? I CAN'T OUITE UNDERSTAND WHY THE REGIONAL EMPHASIS DESERVES AS MUCH EMPHASIS 11 12 AS IT'S GOTTEN UP-TO-DATE. FINALLY, I'LL SAY THAT THE EMPHASIS ON 13 14 REGIONAL CARBON FLUXES, AS REPRESENTED SAY IN CARBON 15 TRACKER, WHICH IS A REAL BREAKTHROUGH I THINK, IS 16 STILL IN ITS INFANCY. AND THE REAL QUESTION HERE 17 REVOLVES AROUND TIME SCALES OF DECADES OR LONGER. SO 18 WHAT WE HAVE TO DO IS TO GET CARBON TRACKER TO GO 19 THROUGH A DECADE-OR-TWO WINNOWING PROCESS, THROUGH 20 ITS OWN WAR ON SYSTEMATIC ERROR, BEFORE WE'RE GOING 21 TO GET REAL ANSWERS FROM IT THAT PERTAIN TO THIS PROBLEM. WE SHOULDN'T GIVE UP, BUT WE SHOULD 2.2 23 RECOGNIZE THAT THE TIMELINE FOR THOSE PAYING OFF IS 24 20 YEARS IN THE FUTURE. DR. SPINRAD: WITH THAT, I'M GOING TO ASK 25 0136 1 THE AUDIENCE TO GIVE THIS PANEL ONE MORE ROUND OF

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APPLAUSE.