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Physiological and Inventory Data of Crews of ARES-III and LEARN Analog Missions in the LunAres Habitat

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Abstract

Analog missions offer a comparatively safe and focused alternative to real human spaceflight missions, thus offering a test and discovery environment for many aspects of future crewed missions to space. In addition, the controlled and often isolated conditions allow to consistently collect a large amount of data that reflect the circumstances and constraints of the analog mission. This paper is a report of the environmental and physiological data from two analog missions that occurred during the summer of 2018 - a Mars analog mission Ares-III and a Lunar analog mission LEARN, both conducted in the same isolated habitat : the Lunares Research Base based in Piła, Poland. Each mission was two weeks long and performed in full isolation from the outside world, with a finite inventory of food and drinking water. Both crews used the same format to track a variety of data categories, consistently doubling the volume of available data. Categories of data collected included nutritional data and daily measurements of physiological and medical data (weight, heart rate, blood pressure, sleep duration and quality) both in the morning and in the evening. The outcomes of daily physical exercise were also collected, including calories burned by running, yoga and strength exercises respectively. Both missions worked with a custom spreadsheet to track their per-crew member food consumption in relation to the mission inventory. This tool also includes automatic calculation of nutrients consumed for each crew member and compares it to the calories burned during the day, thus providing a daily insight into the caloric balance of the crew. Water consumed and expelled was recorded, as well as waste water used for cleaning, personal hygiene and work in the biolab. The consistency of the database thus allows to analyse the data as a whole for both missions, or to compare the effects of aspects differing between the two missions on other human factors. Examples of these include the differences in diets, since LEARN mission provided purely lyophilised food, while ARES-III crew consumed a combination of conventional meals and lyophilised food, or the difference in crew composition, as ARES-III had a crew larger by one member.

Keywords: analog missions, isolation, human factors, research, physiology, datasets

Acronyms/Abbreviations

EVA	Extra-vehicular Activity
ISS	International Space Station
MCC	Mission Control Crew
NHS	National Health Service
PI	Principal Investigator

1. Introduction

This paper presents and provides access to datasets collected by the analog missions Ares-III and LEARN. These missions took place in 2018 in the LunAres Habitat, each lasting 2 weeks. The datasets presented represent monitoring of the crew and inventory that was not a part of other experiments, or where the gathered data is considered useful for further study outside of the analyses conducted as a part of the original campaigns. Both missions collected most of the physiological and inventory data using the same methodology, however some datasets are only available for one of the missions.

1.1 Aims of the paper

The Ares-III and LEARN missions generated a wealth of data, the majority of which was collected for the purposes of specific experiments. In addition to these activities, the crews performed regular measurements of their physiological parameters such as blood pressure, weight, calorie expenditure and many

others. Together with inventory monitoring, e.g. food consumption by weight, water quantities used for drinking and utility, etc., these data can provide an insight into the inventory requirements and physiological trends that these datasets capture. The harmonisation of the data collection between the two missions enables treating the datasets as either a) having more participating subjects, or b) direct comparisons between the two missions.

This data paper provides open access to these datasets. The data presented capture a complex picture of food and water consumed against energy and water expended, together with impacts on physiological variables such as heart measurements, body weight and others. As a result, there are a number of potential comparisons and trends to be analysed, which at the time of the missions were considered out of scope of the two projects. Therefore, the use of the data by other research teams, either in projects dedicated to analysis of these datasets, or in support of other works, is expected and encouraged.

1.2 Analog Missions - Motivation & Methodology

The near future agency and private roadmaps for human space exploration foresee long spaceflight trips, as human crews venture beyond low earth orbit. The plans include month-long lunar visits in the short term, and crewed missions to Mars later in the future [1]. Long duration crewed missions pose more complex challenges, in comparison to those faced by crews onboard the International Space Station (ISS). The hostile environments that the Moon and Mars pose numerous risks, such as putting astronauts in a heightened sense of isolation during long missions. The distance of these destinations from Earth also impacts cargo resupply missions, by increasing the criticality and reducing their feasible frequency [2] [3] [4]. The distance also means a delay in communications time between 4 and 24 minutes in the case of Mars; there will also be an increase in dependency on both locally and remotely operated robotic technology [5].

To date, the only experience of humans visiting an extraterrestrial body are the Apollo missions. However, the maximum time spent on the lunar surface was 75 hours during Apollo 17 in 1972 [6]. To ensure crew survival and preparedness, preparatory activities are necessary. The ISS is used for these purposes, especially involving microgravity, however the station cannot be used to simulate all aspects of a Lunar or Martian mission, especially the surface operations. Earth based analogue missions are suitable to simulate missions to extraterrestrial bodies, to generate data and knowledge for aspects of future surface missions. Equivalently, an analogue campaign cannot fully replicate the conditions of the lunar or martian environment, but a variety of analogue sites focus on different aspects of potential real missions to these destinations, and thus can be used in conjunction to prepare for the future of human spaceflight.

The usual duration of an analog mission is typically between a few weeks and a few months, during which development and verification of hardware, software and operations for future missions takes place, often trading off fidelity of the simulation for a faster rate and lower cost. To give specific examples, missions take place in deserts to test exploration, mobile robotic operations and field work methods, underwater to emulate low-gravity environments, and in caves for teamwork and psychological impact tests in a challenging environment that is similar to off-world exploration [7] [8] [9].

1.3 Project Background

As stated previously, the data presented in this paper were gathered alongside other activities and experiments performed during the analog missions. To gain further context and understand if there are potential influences on the data presented, please see [10], which outlines the other activities performed during the missions.

1.3.1 LunAres Habitat

The data presented in this paper was generated alongside the activities performed during two separate 15-day missions – one Martian, one Lunar – in the LunAres Research Base in Piła, Poland, in 2018. LunAres is a habitat for analog space research, which focuses on human factors and sustainable technologies. The complete isolation of the habitat from the outside world – mainly due to its remote location at an airfield, combined with deliberate design lacking windows, thus providing complete absence of access to daylight – enables studies investigating effects of full isolation on the crew, as well as experiments focused on circadian rhythm in humans. The circadian rhythm experiments are particularly useful when simulating different day durations, e.g. when simulating 1 sol duration of Mars. The habitat is centered around a domed living quarter, from which the crew can access several modules of different purposes. In 2018, i.e. when the missions took place these were designated as follows: the bathroom, kitchen, dormitory, storage, operations room, biological laboratory, analytical laboratory, and airlock. Each space is equipped with sensors measuring humidity and temperature, and cameras. The airlock leads to a disused military hangar, converted to a 250 m^3 Extra-vehicular Activity (EVA) terrain using regolith simulant to model the Lunar and Martian surfaces. Accessing this area in simulation must be through the airlock, in which analog astronauts follow a procedure to simulate

decompression before stepping from the airlock to the "surface" and recompression before re-entering the habitat from the airlock.

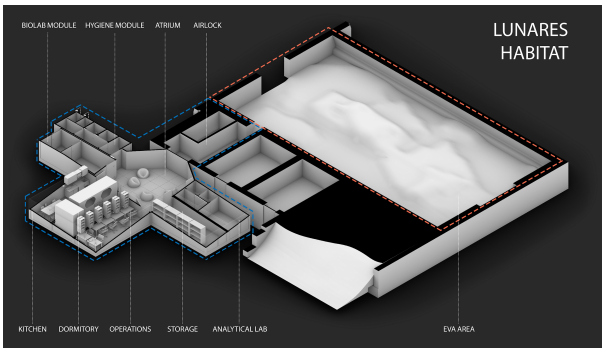

Fig. 1.1 Layout of the LunAres habitat, by SpaceIsMore

Mission crews follow Lunar or Martian time (depending on the mission), meaning the mission time drifts away from the Earth time, and thus away from the time followed by the external Mission Control Crew, which remotely supports the crew in the habitat. The Mission Control Crew (MCC) coordinates the mission from the outside and communicates with the crew commander daily to observe and discuss the status of the mission and the daily plan for the analog crew, equivalently to the ground support personnel in real crewed missions. At the time of ARES-III and LEARN, the mission control team consisted of the Flight Director, Science Data Officer, Capsule Communicator, HabitatOS Engineer, and Flight Surgeon. Mars simulations (including ARES-III) a 20 minute communication time delay is observed between the MCC and the Analog Astronaut Crew in the habitat. The analog crews consisted of the Commander, Vice-Commander, Communication Officer, Environmental Control and Life Support System Engineer, Data Officer, and Crew Medical Officer. A group of Principal Investigators (PIs) also take part in each mission by providing experiments that the crew conducts, and are also involved in consulting any uncertainties and discrepancies in their experiments with the analog crew via the MCC. The habitat crew follows a predetermined daily activity plan, which outlines the expected 8 hours of work per day for each crew member.

1.3.2 Ares-III Mission

Ares-III was a 15-day Mars simulation mission. The analog astronaut crew consisted of six members coming from four different nationalities (three males, three females). Since ARES-III was a Mars analog, the crew observed a 20 minute time delay when communicating with the mission control in any form. The length of one mission day was set to be equivalent to 1 Martian Sol, i.e. 24 hour 40 minutes.

Fig. 1.2 ARES-III mission patch, design by Szymek Drobniak

1.3.3 LEARN Mission

The LEARN mission was a Lunar analog campaign conducted by a crew of five (three males, two females) coming from four different nationalities. The ages of the crew members ranged from 21 to 30 in age. The crew and the MCC agreed that the 1.3 second delay in communication time between the Earth and Moon is negligible, the crew did not observe any additional communications delay between the habitat and MCC, permitting the use of video and voice methods for contact, in addition to text. The length of one mission day was decided to follow the time between moonrises, which is one of the definitions of a "lunar day", totalling 24 hours and 50 minutes. An additional condition placed upon the LEARN analog astronaut crew was that only lyophilised (freeze-dried) food was to be consumed for the entire duration of the mission.

Fig.1.3 LEARN mission patch, design by Lionel Garcia

2. Data Types and Collection Methodology

2.1 Crew Details

The collected data is anonymised. The participants - in this case the two analog astronaut crews - are instead represented by a unique identifier. Identifiers A1-A6 represent the ARES-III crew, and the L1-L5 labels identify the LEARN crew. In addition, height, weight, age and gender are provided for further physiological context. The details of each crew are shown in Table 1.

Table 1: Crew details for ARES-III and LEARN missions

	Ares-III Crew					
	A1	A2	A3	A4	A5	A6
Height (m)	1.72	1.6	1.65	1.8	1.76	1.72
Weight (kg)	62	72.7	73.3	70.1	69	72.5
Age (years)	29	32	32	24	23	24
Gender	F	F	F	M	M	M
	LEARN Crew					
	L1	L2	L3	L4	L5	
Height (m)	1.72	1.79	1.87	1.69	1.87	
Weight (kg)	79	87	70	65	64	
Age (years)	28	25	26	30	21	
Gender	F	M	M	F	M	

2.2 Medical Data

Medical data collected is shown in Table 2. Each measurement was made twice daily - once immediately after waking up, and once immediately before going to bed.

Table 2: Medical data collected in ARES-III and LEARN missions

	ARES-III	**LEARN**
Body temperature		
Blood pressure		
Heart rate		
Pulse oximetry		
Body weight	X	
Body fat percentage	X	

Body temperature was collected by placing a thermometer under the armpit. Blood pressure was collected with a blood pressure monitor with a cuff around the upper arm. Heart rate and pulse oximetry were measured with a pulse oximeter. Body weight and body fat percentage were measured with digital scales.

The equipment used in these measurements consisted of regular household versions of the measurement devices listed in the previous paragraph.

The medical data can be found in Appendix A.1.

2.3 Exercise

Each day crew members were required to conduct one hour of exercise. The most common exercise was running on a treadmill, for a duration decided by the crew member, with remaining exercise time used for strength exercises or yoga. On completion, distance travelled (in case of running), time spent running, heart rate at the end of the exercise, and calories burned by running were recorded - these variables constitute the first 4 columns of the exercise table. The next two columns are dedicated to calories burned by yoga and workout. The final column of the table is the sum of calories burned by all 3 forms of exercise.

The crew members were permitted by the MCC to occasionally skip the exercise slot in favour of other activities, e.g. when a previous activity ran longer than anticipated, or other higher-priority activity required the crew members attention. Such cases are indicated in the data as missing values for that day.

The LEARN crew performed yoga exercises as a part of their morning routine every day, with the exception of days 1, 8 and 15, therefore yoga calories are present also on days where a LEARN crew member might have skipped their scheduled exercise slot. The only exception to this routine is the crew member L3 skipping the morning yoga on day 13.

Another point to note is that the ARES-III calories burned by yoga and workout have the same value throughout the mission for each ARES-III crew member respectively. This is due to the calorie values being approximated based on the physiology of each crewmember.

The calories and heart rate were monitored using Fitbit activity trackers worn on wrists. Time was tracked either by a stopwatch embedded in the treadmill, or by the Fitbits.

The exercise data can be found in Appendix A.2.

2.4 Nutrition

Each crew ate three meals each day, with optional snacks in between. For all food consumed, be it a meal or a snack, each crew member measured the weight of their portion using a digital kitchen scale. The measured weight for each meal was recorded in a custom spreadsheet, calculating the nutrient intake with each meal for each crew member from the known nutrient composition of the given meal and/or ingredients. For freeze-dried food, the weight was measured in the dry state and a second measurement was made after adding water - this added water was logged as water consumed (see section 2.5).

Together with medical data (outlined in 2.2) and exercise data (outlined in 2.3), the daily calorie balance and crew member weight change were calculated.

The nutrition data can be found in Appendix A.3.

2.5 Drinking Water & Urine

The quantity of water consumed by each crew member was recorded each day, as bottles of known volume were used.

Additional water consumed was determined by calculating the difference between dry and wet masses of freeze-dried food (especially during LEARN, where all food consumed was freeze-dried), or by using measured water bottles for other drinks such as teas.

The volume of urine produced each day was measured by each crew member in both missions, by urinating into a measuring container.

These two quantities are recorded in the appropriate data frame side by side as day totals for each crew member, along with the difference between these two values.

The LEARN crew used standard NHS Fluid balance charts to track ingested and expelled water over the course of each day.

For measuring water in general, the ARES crew used handmade marked bottles (one bottle per room with water). Every crewmember had to fully use the water already present in the bottle before filling it up again and every refilling was marked on an assigned booklet.

The drinking water and urine data can be found in Appendix A.4.

2.6 Utility Water

The LEARN Crew recorded utility water. Utility water had several uses: cleaning, for experiments (e.g. plant cultivation), and toilet flushes, and for brushing teeth. Waste water was also recorded - this included drinking water heated up for washing dishes, or drinking water used for personal hygiene (but not drunk). The number of toilet flushes were recorded, whereas the other data types were quantified immediately in volume.

ARES utility water was measured with the same method seen in the 2.5.

The utility water data can be found in Appendix A.5.

2.7 Shower Water

In order to limit water use to a minimum without sacrificing all crew comfort, the LEARN crew decided to use washcloth baths for personal hygiene. Instead of showering, crew members heated the desired volume of water by using a kettle from the kitchen. The water amount was determined using the measured water bottle prior to heating, and then transferred to a basin, to be used with soap and a washcloth for personal hygiene. This method enabled precise measurements of “shower” water used, while also eliminating losses caused by freely running water.

ARES utility water was measured with the same method seen in section 2.5.

The shower water data can be found in Appendix A.6.

More data, and totals, about water consumption can be found in appendix A.8.

2.8 Sleep

Upon waking up, each member of the LEARN and ARES crew recorded their wake up time and time they went to sleep, allowing sleep duration to be calculated.

The sleep data can be found in Appendix A.7.

3. Conclusion

This paper has presented and described a variety of data collected during two human spaceflight analog missions. The authors encourage the readers of this paper to access and use these datasets either for dedicated analyses and further studies, or to support other and/or existing projects.

The data frames can be found in the Appendix A of this paper. Alternatively, the authors can be contacted at poliacek.matej@gmail.com, and a permanent web location with a spreadsheet containing the data frames can be found at https://drive.google.com/drive/u/0/folders/1BmtrJ9x6WV6JMW2ZXF6eXL1MDm-nLYBC

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Appendix A: Data

A.1: Medical Data

A1	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Body weight Morning [kg]
Day 1		35,6			133	93		88	
Day 2	35,10	35,6	112	80	120	77	78	66	62,3
Day3	35,70	35,8	109	73	121	88	90	72	61,5
Day4	35,60	36,1	122	85	123	83	71	78	62
Day5	35,40	36,3	120	78	124	81	74	77	61,7
Day6	35,60	35,9	117	85	120	80	84	78	61,4
Day7	35,60	35,4	126	85	110	73	78	67	61,7
Day8	35,60	36,1	124	77	128	89	69	61	61,9
Day9	35,80	35,9	117	78	122	84	57	64	62
Day10	35,70	35,9	112	73	129	77	72	59	62
Day11	35,90	36,2	109	75	124	87	62	57	62
Day12	35,90	35,8	119	83	112	79	83	82	61,4
Day13	35,60	35,2	125	80	124	85	64	73	61,7
Day14	35,90	35,9	121	80	105	76	68	73	62
Day15	35,90		106	76			64		61,7
Day16									
Min	**35,1**	**35,2**	**106,0**	**73,00**	**105,00**	**73,00**	**57,00**	**57,0**	**61,4**
Max	**35,9**	**36,3**	**126,0**	**85,0**	**133,0**	**93,0**	**90,0**	**88,0**	**62,3**
Average	**35,7**	**35,8**	**117,1**	**79,1**	**121,1**	**82,3**	**72,4**	**71,1**	**61,8**

A2	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Body weight Morning [kg]
Day 1		34,6			108	88		100	
Day 2	35,0	35	110	82	120	87	72	64	73,4
Day3	35,5	35	120	82	124	92	82	75	72,7
Day4	35,6	35,5	110	84	110	86	83	75	72,7
Day5	35,0	35,6	107	76	126	88	80	84	72,7
Day6	35,0	35	116	85	110	87	86	77	72,2
Day7	35,0	34,6	114	79	111	77	83	68	72,7
Day8	34,8	34,8	112	66	118	86	60	72	72,9
Day9	34,9	34,5	116	78	129	90	75	67	72,6
Day10	34,5	34,7	117	83	115	77	72	63	72,8
Day11	34,3		109	70			65		72,4
Day12									
Day13									

Day14									
Day15									
Min	**34,3**	**34,5**	**107,0**	**66,0**	**108,0**	**77,0**	**60,0**	**63,0**	**72,2**
Max	**35,6**	**35,6**	**120,0**	**85,0**	**129,0**	**92,0**	**86,0**	**100,0**	**73,4**
Average	**35,0**	**34,9**	**113,1**	**78,5**	**117,1**	**85,8**	**75,8**	**74,5**	**72,7**

A3	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Body weight Morning [kg]
Day 1		36,7			111	79		88	
Day 2	36,6	36,3	110	76	113	73	95	89	74,0
Day3	36,3	36,4	105	77	108	79	104	92	73,8
Day4	36,4	36,7	101	67	130	89	87	97	73,5
Day5	36,6	36,5	109	66	124	74	88	82	73,3
Day6	36,4	36,3	100	70	100	66	88	83	73,7
Day7	36,3	36,2	117	93	107	79	99	85	73,3
Day8	35,7	36,2	103	70	110	77	82	78	73,8
Day9	36,8	36,1	106	67	107	75	87	80	73,6
Day10	36,7	36,2	97/	76	110	76	83	82	72,9
Day11	36,4		109	71			86		73,2
Day12									
Day13									
Day14									
Day15									
Min	**35,7**	**36,1**	**100,0**	**66,0**	**100,0**	**66,0**	**82,0**	**78,0**	**72,9**
Max	**36,8**	**36,7**	**117,0**	**93,0**	**130,0**	**89,0**	**104,0**	**97,0**	**74,0**
Average	**36,4**	**36,4**	**106,7**	**73,3**	**112,0**	**76,7**	**89,9**	**85,6**	**73,5**

A4	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Body weight Morning [kg]
Day 1		36,2			115	79		82	
Day 2	35,6	35,8	108	72	128	81	74	82	70,5
Day3	35,3	35,9	114	71	105	77	74	83	70,4
Day4	35,2	35,8	112	72	107	76	69	67	70,5
Day5	36,0	35,6	111	76	104	67	70	69	70,2
Day6	35,6	36,3	104	75	107	75	79	77	70,4
Day7	35,8	35,8	113	78	106	71	77	63	70,4
Day8	35,7	35,6	110	75	119	75	61	56	70,3
Day9	35,4	34,9	103	73	108	77	67	66	70,1
Day10	35,8	35,8	108	73	109	69	59	68	70,0
Day11	35,2	35,8	109	74	109	69	60	68	70,5

Day12	35,4	35,6	109	82	118	84	88	62	70,0
Day13	35,9	35,2	111	71	112	74	62	64	70,0
Day14	34,5	35,6	110	76	109	69	60	63	70,0
Day15	35,5		107	66			68		70,1
Min	**34,5**	**34,9**	**103,0**	**66,0**	**104,0**	**67,0**	**59,0**	**56,0**	**70,0**
Max	**36,0**	**36,3**	**114,0**	**82,0**	**128,0**	**84,0**	**88,0**	**83,0**	**70,5**
Average	**35,5**	**35,7**	**109,2**	**73,9**	**111,1**	**74,5**	**69,1**	**69,3**	**70,2**

A5	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Body weight Morning [kg]
Day 1		36,3			128	68		74	
Day 2	35,6	35,6	121	77	125	65	91	55	68,3
Day3	35,4	35,9	121	74	129	70	81	81	68,3
Day4	35,2	35,9	119	71	116	60	86	74	68,3
Day5	35,5	36,4	116	73	115	56	87	60	68,0
Day6	35,7	35,9	122	54	111	70	78	69	67,9
Day7	35,2	35,4	129	74	120	61	72	61	69,4
Day8	36,5	35,5	130	82	129	70	80	60	68,5
Day9	35,2	38,5	119	61	121	75	69	67	68,1
Day10	35,2	35,6	116	74	128	65	87	75	68,1
Day11	35,4	35,7	124	64	124	78	64	59	68,9
Day12	35,8	36,1	116	84	124	66	85	63	68,7
Day13	35,6	35,6	130	78	122	68	62	62	68,7
Day14	35,5	35,6	130	62	134	79	61	65	69,6
Day15	35,6		124	78			66		68,7
Min	**35,2**	**35,4**	**116,0**	**54,00**	**111,00**	**56,00**	**61,00**	**55,0**	**67,9**
Max	**36,5**	**38,5**	**130,0**	**84,0**	**134,0**	**79,0**	**91,0**	**81,0**	**69,6**
Average	**35,5**	**36,0**	**122,6**	**71,9**	**123,3**	**67,9**	**76,4**	**66,1**	**68,5**

A6	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Body weight Morning [kg]
Day 1		36,3			142	82		76	
Day 2	35,6	36,7	127	76	127	76	85	89	73,6
Day3	36,4	36,1	127	74	114	71	89	94	72,1
Day4	36,2	35,2	136	84	133	85	82	80	72,8
Day5	36,3	36,5	130	66	128	63	81	80	72,3
Day6	36,3	36,2	132	71	126	74	89	83	72,6
Day7	36,4	36	133	59	128	70	82	79	72,6
Day8	35,7	35,9	128	67	128	71	81	72	73,4
Day9	35,9	35,3	130	74	127	73	80	68	72,8

Day10	36,0	35,4	131	72	127	70	83	70	72,5
Day11	35,9	35,3	126	71	114	70	84	68	72,9
Day12	35,6	35,9	127	65	130	74	73	79	72,5
Day13	35,4	35,9	118	70	127	68	67	70	72,5
Day14	35,9	36	127	74	122	71	78	64	72,5
Day15	36,1		137	78			71		72,2
Min	**35,4**	**35,2**	**118,0**	**59,00**	**114,00**	**63,00**	**67,00**	**64,0**	**72,1**
Max	**36,4**	**36,7**	**137,0**	**84,0**	**142,0**	**85,0**	**89,0**	**94,0**	**73,6**
Average	**36,0**	**35,9**	**129,2**	**71,5**	**126,6**	**72,7**	**80,4**	**76,6**	**72,7**

L1	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Pulse Oxymetry Morning	Pulse Oxymetry Evening	Body weight Morning [kg]	Body Weight Evening	body fat % morning	body fat % evening
Day 1	36,5	36,1	101	76	116	70	75	78	99	99	80,6	81,1	23,3	
Day 2	36,8	36,7	114	65	112	74	73	74	99	99	80,8	80,1		
Day3	36,1	35,9	109	61	104	73	75	83	99	96	79,5	79,8		
Day4	36,5	36,6	106	55	122	75	78	70	99	99	79,4	79,8		
Day5	36,1	36,2	115	79	124	82	77	72	99	99	79,2	79,8		
Day6	36,0	36,2	113	71	117	64	80	79	99	99	79,5	79,8		
Day7	36,3	36,0	110	72	133	84	89	64	99	99	79,2	79,3		
Day8	35,8	36,4	115	78	110	78	84	64	98	99	78,8	78,9		
Day9	35,5	35,5	126	81	134	85	78	68	99	99	78,4	79		
Day10	35,5	36,2	126	86	118	73	75	65	99	99	78,3	78,9		
Day11	35,5	36,0	115	73	124	85	58	69	99	99	78,3	79		
Day12	35,6	35,8	125	78	118	60	69	82	99	99	78,5	78,7		
Day13	35,0	35,8	109	70	117	60	82	69	99	99	78	78,5		
Day14	35,8	36,4	128	79	128	79	69	77	99	99	78	78,4		
Day15	35,7	36,5	118	60	124	84	80	86	99	99	78	78,3		
Day16														
Min	**35,0**	**35,5**	**101,00**	**55,00**	**104,00**	**60,00**	**58,0**	**64,0**	**98,0**	**96,0**	**78,0**	**78,3**	**23,3**	
Max	**36,8**	**36,7**	**128,0**	**86,0**	**134,0**	**85,0**	**89,0**	**86,0**	**99,0**	**99,0**	**80,8**	**81,1**	**23,3**	
Average	**35,9**	**36,2**	**115,3**	**72,3**	**120,1**	**75,1**	**76,1**	**73,3**	**98,9**	**98,8**	**79,0**	**79,3**	**23,3**	

L2	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Pulse Oxymetry Morning	Pulse Oxymetry Evening	Body weight Morning [kg]	Body Weight Evening	body fat % morning	body fat % evening
Day 1	36,4	35,6	126	82	132	60	61	69	-	97	87,3	87,5	22,7	21,1
Day 2	35,6	35,2	130	78	130	93	64	60	98	98	86,5	87,1	22,2	22,2
Day3	35,3	35,1	122	77	128	74	51	61	99	98	86,3	87,5	22,7	22,1
Day4	35,3	36,0	128	90	137	88	52	63	98	97	86,7	87,8	21,7	21,4

Day5	35,0	36,7	138	81	128	75	46	86	99	97	87,5	87,4	21,4	20,7
Day6	35,7	36,4	140	94	136	88	46	73	97	97	87	86,2	21	20,7
Day7	35,3	36,2	131	81	117	86	55	83	97	100	86,2	86,3	20,7	20,1
Day8	35,1	36,0	122	76	133	76	49	77	97	98	86	86,4	19,9	20,2
Day9	35,4	36,3	129	78	135	79	51	76	99	99	86,3	87,2	20,6	20,3
Day10	35,4	35,8	140	79	136	73	44	54	100	97	86,9	86,7	20,5	19,7
Day11	35,5	35,2	107	68	112	74	42	49	96	99	86,5	86,2	21	21,1
Day12	35,3	36,3	117	66	137	64	47	56	99	99	86,7	86,6	21,5	21,2
Day13	35,8	37,0	130	74	136	66	47	76	98	98	86	86	21,1	21,4
Day14	35,9	34,8	126	72	127	76	71	68	99	100	85,9	86	21,5	21,8
Day15	35,5	36,1	144	89	128	72	61	56	97	99	85,1	86,4	21,9	22,2
Min	**35,0**	**34,8**	**107,00**	**66,00**	**112,00**	**60,00**	**42,0**	**49,0**	**96,0**	**97,0**	**85,1**	**86,0**	**19,9**	**19,7**
Max	**36,4**	**37,0**	**144,0**	**94,0**	**137,0**	**93,0**	**71,0**	**86,0**	**100,0**	**100,0**	**87,5**	**87,8**	**22,7**	**22,2**
Average	**35,5**	**35,9**	**128,7**	**79,0**	**130,1**	**76,3**	**52,5**	**67,1**	**98,1**	**98,2**	**86,5**	**86,8**	**21,4**	**21,1**

L3	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Pulse Oxymetry Morning	Pulse Oxymetry Evening	Body weight Morning [kg]	Body Weight Evening	body fat % morning	body fat % evening
Day 1	35,9	35,6	125	80	117	80	91	82	-	98	73,3	73,3	17	17,2
Day 2	35,6	35,9	111	71	124	75	68	74	96	96	73,1	72,9	17,7	17,7
Day3	35,6	35,9	125	67	121	73	66	67	98	98	72,9	73,5	17,9	17,9
Day4	35,4	35,8	110	67	123	79	72	73	97	98	73,1	73	18	17,9
Day5	35,4	36,1	124	77	129	74	70	69	99	99	72,6	72,7	18,1	18
Day6	35,4	35,9	119	82	119	76	59	71	100	99	72,2	72,6	18,2	18,2
Day7	35,5	36,0	116	71	130	86	67	75	99	99	71,7	72,2	18,6	18,8
Day8	35,3	36,2	119	76	123	79	63	60	98	98	71,7	72	19	18,6
Day9	35,5	36,2	133	81	129	89	75	80	99	98	71,8	72	18,4	18,3
Day10	35,5	36,6	111	81	132	89	82	90	98	100	71,3	72	18,3	16,7
Day11	35,7	36,6	128	75	119	76	70	80	100	96	71,5	71,8	17,9	17,1
Day12	36,1	36,7	128	79	124	76	68	86	98	98	71,2	71,4	17,2	17,2
Day13	35,7	36,5	129	72	122	75	80	84	99	98	70,9	71,4	17,3	17,2
Day14	35,8	36,5	130	86	119	84	63	86	100	97	71,2	71,5	16,9	16,6
Day15	35,5	36,2	110	66	133	86	75	80	97	96	70,7	71,6	16,6	16,4
Min	**35,3**	**35,6**	**110,00**	**66,00**	**117,00**	**73,00**	**59,0**	**60,0**	**96,0**	**96,0**	**70,7**	**71,4**	**16,6**	**16,4**
Max	**36,1**	**36,7**	**133,0**	**86,0**	**133,0**	**89,0**	**91,0**	**90,0**	**100,0**	**100,0**	**73,3**	**73,5**	**19,0**	**18,8**
Average	**35,6**	**36,2**	**121,2**	**75,4**	**124,3**	**79,8**	**71,3**	**77,1**	**98,4**	**97,9**	**71,9**	**72,3**	**17,8**	**17,6**

L4	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Pulse Oxymetry Morning	Pulse Oxymetry Evening	Body weight Morning [kg]	Body Weight Evening	body fat % morning	body fat % evening
Day 1	35,6	36,1	101	76	100	58	81	76	97	98	64,5	66		18

Day 2	36,6	35,8	104	77	123	79	67	81	97	86	66	66	17,1	
Day3	36,3	35,7	128	89	119	89	89	76	86	77	64,5	66,5		
Day4	36,3	36,0	122	75	150	64	83	74	97	100	65	66	17,1	
Day5	36,1	36,1	125	78	121	85	85	73	100	100	65,4	65,2	17,9	18,7
Day6	36,3	35,9	145	76	115	77	76	86	100	97	64,6	65,3		17,9
Day7	35,9	35,9	108	49	121	83	75	79	99	98	64,8	65,4		17,4
Day8	36,1	35,6	119	79	120	76	78	67	99	95	64,5	64,5		
Day9	35,9	35,9	141	97	136	66	69	62	97	100	64	64,5	17,1	
Day10	35,8	36,3	121	74	139	70	73	82	99	98	64,5	65	17,4	18,4
Day11	36,1	35,8	97	87	130	90	72	79	100	96	64,2	64,5	18	18,7
Day12	36,0	35,8	111	43	126	84	75	83	99	95	63,5	64,5	18,2	
Day13	35,9	35,5	96	71	106	70	98	69	98	96	63,5	63,9	18	
Day14	36,0	36,5	109	59	117	86	70	89	99	97	63,8	64,3	16,4	16,4
Day15	36,0	36,0	119	77	111	71	67	69	99	99	63	63,3		16,5
Min	**35,6**	**35,5**	**96,00**	**43,00**	**100,00**	**58,00**	**67,0**	**62,0**	**86,0**	**77,0**	**63,0**	**63,3**	**16,4**	**16,4**
Max	**36,6**	**36,5**	**145,0**	**97,0**	**150,0**	**90,0**	**98,0**	**89,0**	**100,0**	**100,0**	**66,0**	**66,5**	**18,2**	**18,7**
Average	**36,1**	**35,9**	**116,4**	**73,8**	**122,3**	**76,5**	**77,2**	**76,3**	**97,7**	**95,5**	**64,4**	**65,0**	**17,5**	**17,8**

L5	Morning body temperature	Evening body temperature	Morning blood pressure - systolic	Morning blood pressure - diastolic	Evening blood pressure - systolic	Evening blood pressure - diastolic	Morning Heart Rate [bpm]	Evening Heart Rate [bpm]	Pulse Oxymetry Morning	Pulse Oxymetry Evening	Body weight Morning [kg]	Body Weight Evening	body fat % morning	body fat % evening
Day 1	36,3	35,8	127	76	121	88	84	59	-	-	65	65		
Day 2	35,0	35,8	123	89	125	80	64	66	99	100	64	64,8	20,4	17,8
Day3	35,9	35,8	111	70	107	69	69	65	100	98	64,5	65,8	17,5	17,1
Day4	35,5	35,8	118	69	123	86	60	58	98	99	64,8	66,1	17,5	17,3
Day5	35,2	35,0	121	80	123	73	74	61	100	100	64,6	65,6	17,2	17,7
Day6	35,3	36,6	123	71	106	67	59	60	100	96	64,9	64,2	17,9	17,4
Day7	35,2	36,6	121	71	121	83	66	77	96	96	64,1	64,1	17,1	17,1
Day8	35,6	35,9	115	73	125	84	68	55	98	100	64,4	64,3	16,9	16,6
Day9	35,3	36,2	121	78	121	70	58	65	98	98	64,1	64,4	17,4	17,2
Day10	35,2	36,0	138	90	122	79	60	66	100	98	64,1	65,1	17,1	19,3
Day11	35,6	36,1	116	75	125	82	68	62	99	99	64,2	65,2	19	18,5
Day12	35,6	35,9	129	87	125	82	62	60	100	97	64,4	65,3	17,2	14,4
Day13	35,5	36,5	124	75	128	83	77	56	96	100	64,9	64,8	15,1	15,5
Day14	35,1	36,2	120	78	124	82	59	65	97	97	64	65,1	17,7	16,8
Day15	35,0	36,7	122	86	121	63	67	68	96	96	64,6	64,5	16,4	16,1
Min	**35,0**	**35,0**	**111,00**	**69,00**	**106,00**	**63,00**	**58,0**	**55,0**	**96,0**	**96,0**	**64,0**	**64,1**	**15,1**	**14,4**
Max	**36,3**	**36,7**	**138,0**	**90,0**	**128,0**	**88,0**	**84,0**	**77,0**	**100,0**	**100,0**	**65,0**	**66,1**	**20,4**	**19,3**
Average	**35,4**	**36,1**	**121,9**	**77,9**	**121,1**	**78,1**	**66,3**	**62,9**	**98,4**	**98,1**	**64,4**	**65,0**	**17,5**	**17,1**

A.2: Exercise Data

A1	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Total calories
Day 1	2,8	20	203	135	49	119	371
Day 2	5,7	50	424	119	49	119	592
Day3	5,3	50	399	169	49	119	567
Day4	5,5	50	412	167	49	119	580
Day5	6,0	35	427	152	49	119	595
Day6	7,0	41	498	171	49	119	666
Day7	6,0	40	433	-	49	119	601
Day8	8,0	52	575	123	49	119	743
Day9	7,5	59	551	-	49	119	719
Day10	5,0	27	353	-	49	119	521
Day11	7,0	37	494	138	49	119	662
Day12	6,0	30	421	152	49	119	589
Day13	-	-		-	49	119	168
Day14	6,0	30		152	49	119	168
Day15							
Min	2,8	20	203	119	49	119	168
Max	8,0	59	575	171	49	119	743
Average	6,0	40	433	148	49	119	539

A2	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Total calories
Day 1	5	60	515	130	66	178	759
Day 2	5.4	60	549	133	66	178	793
Day3	5	60	515	140	66	178	759
Day4	2.5	30	224	115	66	178	468
Day5	6.7	60	660	133	66	178	904
Day6	5	50	500	145	66	178	744
Day7	6.1	60	609	135	66	178	853
Day8	2.5	25	233	118	66	178	477
Day9	5.0	50	500	128	66	178	744
Day10	6.1	60	609	123	66	178	853
Day11	6.8	65	676	130	66	178	920
Day12	5.6	60	566	112	66	178	810
Day13	6.1	60	609	133	66	178	853
Day14	6.0	30		152	66	178	244
Day15							
Min	5	25	224	112	66	178	244

Max	5	65	676	152	66	178	920
Average	5	52	520	131	66	178	727

A3	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Total calories
Day 1	-	-		-	67	179	246
Day 2	3	30	294	110	67	179	540
Day3	2.6	35	268	110	67	179	514
Day4	2.6	35	268	112	67	179	514
Day5	3.3	47	344	107	67	179	590
Day6	4	50	406	110	67	179	652
Day7	3.9	44	389	108	67	179	635
Day8	2.3	28	233	105	67	179	479
Day9	-	-		-	67	179	246
Day10	3.4	35	335	106	67	179	581
Day11	-	-		-	67	179	246
Day12	-	-		-	67	179	246
Day13	-	-		-	67	179	246
Day14	-	-		-	67	179	246
Day15							
Min	3	28	233	105	67	179	246
Max	4	50	406	112	67	179	652
Average	3,5	38	317	109	67	179	427

A4	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Total calories
Day 1	4.3	43	337	110	53	127	517
Day 2	4.5	46	354	150	53	127	534
Day3	4.7	50	372	135	53	127	552
Day4	5.1	50	398	136	53	127	578
Day5	5.0	45	386	156	53	127	566
Day6	5.5	45	419	140	53	127	599
Day7	5.1	43	390	140	53	127	570
Day8	6.9	60	530	150	53	127	710
Day9	6.3	60	490	120	53	127	670
Day10	3.3	30	255	110	53	127	435
Day11	6.1	50	465	110	53	127	645
Day12	6	60	470	110	53	127	650
Day13	7	60	537	110	53	127	717
Day14	3.6	35		105	53	127	180

Day15							
Min	6	30	255	105	53	127	180
Max	7	60	537	156	53	127	717
Average	6,5	48	416	127	53	127	566

A5	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Total calories
Day 1	10.8	57	771	125	51	126	948
Day 2	8.1	45	581	123	51	126	758
Day3	5.6	31	402	138	51	126	579
Day4	10.1	61	730	135	51	126	907
Day5	11.5	60	821	135	51	126	998
Day6	10.0	51	712	115	51	126	889
Day7	6.0	30	427	110	51	126	604
Day8	12.0	60	853	120	51	126	1030
Day9	11.0	55	782	119	51	126	959
Day10	8.0	40	569	92	51	126	746
Day11	11.6	60	827	126	51	126	1004
Day12	8.0	40	569	109	51	126	746
Day13	9.4	47	668	122	51	126	845
Day14	12	60		133	51	126	177
Day15							
Min	12	30	402	92	51	126	177
Max	12	61	853	138	51	126	1030
Average	12	50	670	122	51	126	799

A6	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Total calories
Day 1	-	-		-	56	135	191
Day 2	7.4	50	590	160	56	135	781
Day3	3,5	30	287	149	56	135	478
Day4	3,9	30	316	126	56	135	507
Day5	5.3	40	428	175	56	135	619
Day6	7.0	50	562	175	56	135	753
Day7	8.3	60	667	175	56	135	858
Day8	7.0	45	555	163	56	135	746
Day9	9.6	60	760	156	56	135	951
Day10	8.3	50	654	175	56	135	845
Day11	5.4	30	423	150	56	135	614
Day12	5.4	30	423	167	56	135	614

Day13	9.2	50	719	167	56	135	910
Day14	11.2	60	874	167	56	135	1065
Day15							
Min	3,5	30	287	126	56	135	191
Max	3,9	60	874	175	56	135	1065
Average	3,7	45	558	162	56	135	709

L1	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Calories Total
Day 1	3,1	19	200	116			200
Day 2	4,4	30	310	148	79		389
Day3	4	35	320	134	79		399
Day4	4,2	45	335	116	98		433
Day5	5,3	38	350	139	120		470
Day6	3,6	33	215	119	110		325
Day7	4,2	33	300	144	130		430
Day8	4,2	33	300	144			300
Day9					83		83
Day10	4,1	30	300	148	70		370
Day11					100		100
Day12	5,2	40	350	163	120		470
Day13	3,4	40	180	120	100		280
Day14	5	45	300	134	60		360
Day15	4,2	35	310	143			310
Min	3,1	19	180	116	60	0	83
Max	5,3	45	350	163	130	0	470
Average	4,2	35	290	136	96	0	328

L2	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Calories Total
Day 1						200	200
Day 2	2,5	40	160	113	70	60	290
Day3	4	24	240	153	70	40	350
Day4	1,5	10	82	112	90	60	232
Day5	4	20	210	121	60	100	370
Day6	2,7	30	190	95	60	30	280
Day7	2,5	15	150	125	70	60	280
Day8	4,5	25	265	145		100	365
Day9	3,3	30	191	108	100	76	367
Day10	3,2	20	190	131	100	60	350

Day11	2,7	25	160	105	100	60	320
Day12	5	30	300	135	70	50	420
Day13	4,6	22	160	90		60	220
Day14	2,7	19	160	110	80	70	310
Day15	2	12,5	120	120		60	180
Min	1,5	10	82	90	60	30	180
Max	5	40	300	153	100	200	420
Average	3,2	23	184	119	79	72	302

L3	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Calories Total
Day 1	5,2	31	400	159		100	500
Day 2	4,6	25	320	147	70		390
Day3	4	25	240	115	70		310
Day4	4,1	22	240	128	95		335
Day5	5,1	29	300	130	120		420
Day6					125		125
Day7	5,1	28	300	108	110		410
Day8	5,1	26	340	139			340
Day9	5,1	27	330	130	100		430
Day10	6,1	32	410	129	100		510
Day11	4,2	23	285	127	100		385
Day12	7,1	36	460	135	105		565
Day13	6,6	36	420	125	105		525
Day14	10,1	54	700	151	55		755
Day15	8	42	620	139			620
Min	4	22	240	108	55	100	125
Max	10,1	54	700	159	125	100	755
Average	5,7	31	383	133	96	100	441

L4	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Calories Total
Day 1	5	45	300	80			300
Day 2	6,7	50	396	125	100		496
Day3	6,8	50	405	97	100		505
Day4	7,5	50	442	126	98		540
Day5	7,6	50	452	126	82		534
Day6	7,5	50	443	123	80		523
Day7	7,3	50	434	112	120		554
Day8	7,4	50	441	120			441

Day9	7,4	50	441	112	120		561
Day10	7,5	50	443	118	100		543
Day11	7,6	50	450	112	100		550
Day12	3,5	40	200	95	130		330
Day13	6,8	50	400	100	120		520
Day14	7,7	50	455	110	80		535
Day15	8,1	50	400	115			400
Min	3,5	40	200	80	80	0	300
Max	8,1	50	455	126	130	0	561
Average	7,0	49	407	111	103	0	489

L5	Distance [km]	Time [min]	Calories burned	Heart Rate at the end [bpm]	Calories Yoga	Calories P.T.	Calories Total
Day 1	8,7	50	516	137			516
Day 2	6,5	36	370	130	75	50	495
Day3	7	40	410	136	75	85	570
Day4	4,1	25	207	133	95	20	322
Day5	7,7	43,5	457	122	122	30	609
Day6	6,2	35	369	120	122	83	574
Day7	6,3	35	376	116	62	46	484
Day8	6,3	35	372	126		28	400
Day9	6,4	35	377	130	99	45	521
Day10	6,5	35	387	118	63	52	502
Day11	6,7	35	387	139	100	35	522
Day12	6,7	35	395	120	82	40	517
Day13	6,8	35	400	128	63	28	491
Day14	9,9	50	584	138	45		629
Day15	10	50	595	130			595
Min	4,1	25	207	116	45	20	322
Max	10	50	595	139	122	85	629
Average	7,1	38	413	128	84	45	516

A.3: Nutrition Data

A1	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1216,7	16,8	8,6	224,1	70,3	24,6	26,7	2,3	371	-566
SOL 2	1396,1	13,6	3,8	246,9	73,5	14,0	53,3	8,8	592	-608

SOL 3	1459,9	26,9	12,9	231,5	68,4	22,4	54,6	8,9	567	-519
SOL 4	1790,8	47,0	26,9	195,2	85,6	34,6	30,2	4,8	580	-201
SOL 5	1306,4	14,6	3,6	221,5	75,5	23,3	51,2	9,4	595	-700
SOL 6	1812,1	32,3	14,5	281,7	85,7	30,0	78,3	13,3	666	-266
SOL 7	2033,6	49,5	24,3	311,8	122,3	19,2	62,9	12,5	601	21
SOL 8	1314,8	49,9	23,2	164,2	42,2	26,0	31,4	1,8	743	-840
SOL 9	1745,5	43,7	17,6	274,4	78,1	22,0	46,3	7,1	719	-385
SOL 10	1742,9	49,5	21,6	260,2	58,8	17,6	43,9	6,8	521	-190
SOL 11	1612,1	36,3	10,5	247,1	57,4	38,0	49,1	5,1	662	-462
SOL 12	1341,9	44,6	18,5	165,0	52,8	28,2	50,7	6,9	589	-659
SOL 13	1708,5	40,2	18,8	275,1	66,7	22,4	45,4	7,2	168	129
SOL 14	1416,1	27,3	11,0	227,1	64,9	21,4	42,1	6,3	168	-164
BMR	1 412									
Energy expenditure	1 835									

A2	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1321,1	18,5	6,3	214,1	67,5	23,6	59,4	5,6	759,0	-888,8
SOL 2	1556,0	22,0	6,8	236,1	70,4	14,0	85,3	12,3	793,0	-688,0
SOL 3	1469,8	25,7	7,8	223,8	63,1	25,1	65,3	6,1	759,0	-740,2
SOL 4	1694,4	38,7	16,8	147,7	72,7	26,7	76,4	11,5	468,0	-224,5
SOL 5	1315,2	22,5	5,7	217,8	65,2	23,3	41,8	4,1	904,0	-1039,8
SOL 6	1445,1	30,7	8,4	203,1	70,0	31,2	65,2	7,4	744,0	-749,8
SOL 7	1406,8	22,8	5,2	197,2	28,9	32,3	78,7	7,0	853,0	-897,2
SOL 8	1313,9	44,3	20,5	141,0	14,0	25,1	67,5	5,6	477,0	-614,0
SOL 9	1343,0	34,0	8,3	170,7	14,2	26,7	73,7	5,1	744,0	-851,9
SOL 10	1197,9	25,7	7,1	163,0	23,8	20,3	60,5	4,0	853,0	-1106,0
SOL 11	1384,0	39,7	7,7	162,2	16,8	27,9	74,7	4,6	920,0	-986,9
SOL 12	786,5	20,2	4,4	82,5	10,6	27,1	47,8	3,4	810,0	-1474,4
SOL 13	1519,1	25,1	7,1	224,3	31,7	27,3	82,1	6,4	853,0	-784,8
SOL 14	1141,5	25,4	5,0	141,1	28,7	40,0	58,4	7,7	244,0	-553,5
BMR	1451,0	48,4					65,4			
Energy expenditure	1886,2									

A3	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left

SOL 1	1044,0	18,2	6,3	155,0	20,6	23,6	51,9	5,4	246,0	-746,1
SOL 2	1084,3	10,4	3,7	172,1	21,0	13,1	58,8	5,9	540,0	-999,9
SOL 3	1162,9	21,7	9,4	151,9	17,3	20,6	73,2	10,5	514,0	-895,2
SOL 4	1427,6	52,2	40,1	90,4	43,4	18,5	40,6	7,5	514,0	-630,6
SOL 5	905,9	18,2	7,5	121,9	31,1	21,2	46,7	8,0	590,0	-1228,2
SOL 6	1072,5	20,2	8,2	155,0	34,3	17,8	51,1	7,8	652,0	-1123,7
SOL 7	1321,6	25,9	9,7	175,2	54,2	29,0	79,7	13,2	635,0	-857,5
SOL 8	1833,3	70,6	35,1	217,0	57,7	25,2	68,3	9,5	479,0	-189,9
SOL 9	1672,6	48,2	18,2	248,9	72,5	28,1	43,6	2,2	246,0	-117,6
SOL 10	1329,2	29,5	10,0	196,1	35,0	17,7	65,3	8,9	581,0	-796,0
SOL 11	800,2	19,5	5,1	117,1	20,8	24,0	29,8	1,4	246,0	-990,0
SOL 12	354,6	11,6	2,1	39,9	4,6	13,7	14,6	0,6	246,0	-1435,6
SOL 13										
SOL 14										
BMR	1544,2									
Energy expenditure	2007,4									

A4	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1321,1	18,5	6,3	214,1	67,5	23,6	59,4	5,6	517,0	-963,8
SOL 2	1556,0	22,0	6,8	236,1	70,4	14,0	85,3	12,3	534,0	-745,9
SOL 3	1443,8	23,4	8,0	227,0	66,9	25,1	61,6	6,1	552,0	-876,1
SOL 4	1853,8	50,9	29,3	162,5	87,7	26,7	73,9	11,5	578,0	-492,1
SOL 5	1517,6	28,2	9,5	237,7	80,5	22,2	61,0	10,4	566,0	-816,3
SOL 6	1578,9	32,6	9,5	211,1	74,7	31,2	86,1	13,5	599,0	-788,0
SOL 7	1817,2	42,1	16,5	248,9	78,6	32,7	85,4	7,8	570,0	-520,7
SOL 8	1927,7	69,3	32,2	201,5	46,3	33,1	100,3	12,6	710,0	-550,2
SOL 9	1772,3	54,4	18,7	230,6	63,6	28,8	81,2	5,9	670,0	-665,6
SOL 10	1507,3	42,5	18,2	194,0	55,8	31,9	72,3	8,1	435,0	-695,6
SOL 11	2138,9	64,5	18,6	273,9	45,4	38,2	100,0	6,3	645,0	-274,0
SOL 12	1226,1	45,3	14,9	124,6	39,0	31,7	56,6	5,1	650,0	-1191,7
SOL 13	2148,1	54,1	20,0	301,1	62,4	38,9	91,4	7,8	717,0	-336,8
SOL 14	1733,5	48,8	15,7	213,3	59,0	49,5	86,1	9,2	180,0	-214,4
BMR	1767,9						63,1			
Energy expenditure	2298,2									

A5	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1321,1	18,5	6,3	214,1	67,5	23,6	59,4	5,6	948,0	-1371,4
SOL 2	1556,0	22,0	6,8	236,1	70,4	14,0	85,3	12,3	758,0	-946,6
SOL 3	1551,6	25,4	9,1	228,4	66,5	25,1	82,6	12,2	579,0	-772,0
SOL 4	1895,7	55,6	33,4	161,5	86,6	26,7	74,3	11,5	907,0	-755,8
SOL 5	1490,5	26,7	8,7	235,1	75,6	22,2	60,4	9,2	998,0	-1252,0
SOL 6	1559,0	32,6	9,4	206,2	69,8	31,2	86,1	13,5	889,0	-1074,5
SOL 7	1735,3	33,7	14,8	234,7	63,5	31,5	97,3	13,6	604,0	-613,3
SOL 8	2096,2	78,6	35,8	217,3	53,5	34,9	104,8	13,2	1030,0	-678,3
SOL 9	1890,4	56,5	19,5	242,6	64,1	33,0	84,5	6,3	959,0	-813,1
SOL 10	2214,2	53,5	21,8	284,4	75,0	41,5	120,4	15,1	746,0	-276,4
SOL 11	2549,6	74,2	22,4	310,9	61,4	47,2	129,4	13,3	1004,0	-199,0
SOL 12	2184,0	78,8	27,6	219,4	68,6	56,7	112,4	15,1	746,0	-306,5
SOL 13	2504,4	58,2	21,5	325,3	59,2	47,0	143,1	10,6	845,0	-85,1
SOL 14	1871,7	54,3	17,9	219,3	59,3	51,6	91,8	9,8	177,0	-49,9
BMR	1744,5									
Energy expenditure	2267,9									

A6	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1321,1	18,5	6,3	214,1	67,5	23,6	59,4	5,6	191,0	-626,2
SOL 2	1556,0	22,0	6,8	236,1	70,4	14,0	85,3	12,3	781,0	-981,3
SOL 3	1443,8	23,4	8,0	227,0	66,9	25,1	61,6	6,1	478,0	-790,5
SOL 4	1798,0	53,7	32,4	162,4	89,4	26,7	53,4	5,4	507,0	-465,3
SOL 5	1510,4	26,7	8,7	240,0	80,5	22,2	60,5	9,2	619,0	-864,9
SOL 6	1471,3	32,1	9,3	190,4	72,6	26,5	83,4	13,5	753,0	-1038,0
SOL 7	2044,1	42,4	16,5	302,6	120,9	32,7	85,7	7,8	858,0	-570,2
SOL 8	2038,5	75,3	34,8	214,4	55,7	31,9	102,3	12,8	746,0	-463,8
SOL 9	1943,8	53,5	19,5	246,4	67,0	34,8	99,5	12,2	951,0	-763,5
SOL 10	2219,7	61,4	22,3	275,5	71,4	39,4	113,6	12,8	845,0	-381,6
SOL 11	2060,5	50,1	16,1	289,5	53,1	41,2	85,6	6,2	614,0	-309,8
SOL 12	1432,5	57,9	18,6	130,7	41,0	31,1	73,0	6,1	614,0	-937,8
SOL 13	2027,4	53,5	19,9	270,4	54,3	30,4	97,6	7,6	910,0	-638,9
SOL 14	1750,2	48,8	15,7	208,2	54,4	49,5	86,1	9,2	1065,0	-1071,1
BMR	1756,3						65,3			
Energy expenditure	2283,2									

L1	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1343,2	50,3	36,0	168,8	34,7	17,6	36,0	3,6	200,0	-449,9
SOL 2	344,8	14,0	5,7	27,1	5,2	4,4	26,0	1,7	389,0	-1637,3
SOL 3	327,6	6,3	2,6	35,7	16,7	42,4	24,2	0,2	399,0	-1664,4
SOL 4	1120,5	55,3	47,9	124,9	19,8	17,6	21,8	0,0	433,0	-905,5
SOL 5	1130,5	17,2	1,6	145,9	49,7	8,5	91,0	1,9	470,0	-932,5
SOL 6	1131,6	55,0	40,5	119,5	18,6	16,9	29,9	1,7	325,0	-786,4
SOL 7	1206,0	42,0	32,8	157,8	35,3	37,1	30,0	2,2	430,0	-817,0
SOL 8	756,3	37,4	32,1	83,8	13,4	12,6	15,1	0,1	300,0	-1136,8
SOL 9	771,2	37,0	27,0	81,9	11,9	12,7	20,5	1,2	83,0	-904,8
SOL 10	770,9	14,2	4,3	120,9	41,0	10,7	32,3	3,7	370,0	-1192,1
SOL 11	664,6	32,1	26,5	75,4	11,8	13,7	13,6	1,1	100,0	-1028,4
SOL 12	895,9	15,7	4,5	142,6	46,9	6,4	35,6	4,6	470,0	-1167,2
SOL 13	1311,8	26,6	7,6	201,8	36,0	6,0	56,0	7,0	280,0	-561,2
SOL 14	117,8	4,0	1,3	73,3	32,5	2,5	17,7	1,6	360,0	-1835,2
BMR	1593,0									
Energy expenditure	2070,9									

L2	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1311,4	49,9	36,0	161,0	33,1	30,7	37,5	3,1	200,0	-833,8
SOL 2	692,4	16,4	5,3	96,6	17,7	26,7	40,0	1,9	290,0	-1542,8
SOL 3	939,0	27,2	5,2	79,8	10,2	10,4	84,7	2,9	350,0	-1356,2
SOL 4	849,7	22,6	3,6	72,4	9,0	6,1	81,4	1,6	232,0	-1327,5
SOL 5	1036,1	17,8	1,2	119,3	24,7	6,5	84,3	2,7	370,0	-1279,1
SOL 6	934,6	14,6	4,7	155,0	60,6	6,4	42,7	4,0	280,0	-1290,6
SOL 7	1213,1	27,3	4,6	130,6	23,2	7,7	93,3	3,9	280,0	-1012,1
SOL 8	732,7	23,0	7,7	93,7	12,8	4,5	41,1	2,6	365,0	-1577,5
SOL 9	886,5	9,7	2,7	156,3	52,7	12,1	32,0	4,7	367,0	-1425,7
SOL 10	944,2	10,5	2,6	165,1	59,4	25,4	33,5	4,7	350,0	-1351,0
SOL 11	1760,8	31,7	8,9	256,8	131,0	15,4	96,1	12,9	320,0	-504,4
SOL 12	1873,7	28,3	6,2	299,7	72,0	34,7	62,2	11,5	420,0	-491,5
SOL 13	1392,9	31,0	9,4	198,6	38,0	9,4	64,9	7,1	220,0	-772,3
SOL 14	265,7	11,6	4,0	26,1	1,7	6,6	11,8	2,3	310,0	-1989,5
BMR	1945,2									

Energy expenditure	2528,8

L3	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1339,6	50,4	35,8	166,3	32,6	16,9	37,2	3,8	500,0	-742,9
SOL 2	812,6	19,5	2,6	72,1	10,4	6,4	79,8	1,3	390,0	-1159,9
SOL 3	631,6	15,8	4,6	86,8	17,1	6,5	24,4	3,9	310,0	-1261,0
SOL 4	545,1	13,0	3,7	75,8	16,3	4,2	20,8	3,5	335,0	-1372,4
SOL 5	863,5	22,8	3,7	73,7	10,4	6,9	82,2	1,6	420,0	-1139,0
SOL 6	1411,7	68,8	52,5	150,7	23,6	21,3	35,4	1,8	125,0	-295,8
SOL 7	1478,6	59,3	48,6	184,9	34,8	19,4	33,6	2,3	410,0	-513,9
SOL 8	718,0	22,7	7,5	90,8	10,7	4,0	40,7	2,6	340,0	-1204,5
SOL 9	1306,1	64,4	51,0	139,3	20,5	19,8	31,5	1,3	430,0	-706,5
SOL 10	712,4	14,8	3,9	104,4	23,2	4,9	25,4	4,5	510,0	-1380,1
SOL 11	433,0	6,6	1,6	70,3	16,4	6,0	13,6	3,3	385,0	-1534,5
SOL 12	535,4	12,8	3,6	74,4	15,7	4,0	19,9	3,4	565,0	-1612,1
SOL 13	1073,7	26,9	8,3	147,6	19,2	6,1	54,7	5,0	525,0	-1033,8
SOL 14	216,4	9,2	3,1	20,9	1,2	2,7	10,4	1,2	755,0	-2121,1
BMR	1582,5									
Energy expenditure	2057,3									

L4	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1832,8	19,2	3,7	318,0	90,7	16,3	64,0	9,9	300,0	107,7
SOL 2	1508,7	21,0	10,6	276,7	137,1	40,5	45,9	9,2	496,0	-412,4
SOL 3	1414,9	20,8	5,5	241,6	71,0	12,1	47,7	8,4	505,0	-515,2
SOL 4	1862,3	26,2	7,2	316,4	98,6	17,8	65,4	10,3	540,0	-102,8
SOL 5	1769,1	38,2	20,5	284,4	103,4	45,4	66,1	2,4	534,0	-190,0
SOL 6	1701,8	26,2	8,4	278,3	88,2	16,5	67,7	9,3	523,0	-246,3
SOL 7	2248,1	44,9	21,0	352,1	113,4	77,6	77,7	6,3	554,0	269,0
SOL 8	1350,2	30,3	16,0	196,3	67,7	111,6	58,0	1,0	441,0	-515,9
SOL 9	1933,5	18,5	3,1	335,0	103,3	58,8	67,6	9,5	561,0	-52,6
SOL 10	679,1	5,6	1,4	117,5	48,2	80,2	29,8	1,6	543,0	-1289,0
SOL 11	1445,0	20,6	8,7	261,4	137,0	39,6	48,1	11,1	550,0	-530,1
SOL 12	1264,2	18,7	8,3	242,5	136,3	16,7	27,8	13,2	330,0	-490,9
SOL 13	1186,3	12,7	7,0	227,4	139,8	11,8	31,7	12,3	520,0	-758,8
SOL 14	1818,8	22,9	10,2	348,6	190,0	21,9	48,6	16,4	535,0	-141,3
BMR	1425,1									

Energy expenditure	1852,6

L5	Energy [kcal]	Fat [g]	of which saturates [g]	Carbohydrate [g]	of which sugars [g]	Fibre [g]	Protein [g]	Salt [g]	Kcal burned	Kcal left
SOL 1	1685,3	68,5	51,6	204,3	36,8	21,7	42,7	3,6	516,0	-585,8
SOL 2	1316,4	58,9	49,2	153,2	35,4	47,4	28,6	1,2	495,0	-933,7
SOL 3	1667,3	69,6	52,9	201,1	26,4	21,5	55,0	1,5	570,0	-657,8
SOL 4	2053,9	74,5	53,0	263,1	51,5	27,0	53,9	6,7	322,0	-23,1
SOL 5	2358,6	111,7	95,9	265,5	48,3	66,0	49,0	0,1	609,0	-5,5
SOL 6	2268,9	92,1	66,6	266,9	53,7	63,4	62,3	4,6	574,0	-60,2
SOL 7	2322,1	84,6	66,2	306,1	67,7	32,3	53,8	5,6	484,0	83,0
SOL 8	2425,0	92,5	69,5	309,2	53,7	27,8	73,6	3,9	400,0	269,9
SOL 9	1363,2	65,8	51,5	147,6	24,5	21,4	34,1	1,6	521,0	-912,9
SOL 10	2134,7	71,6	52,5	289,2	72,9	35,0	61,0	4,8	502,0	-122,3
SOL 11	1871,4	85,1	71,8	217,1	36,9	59,8	42,0	1,3	522,0	-405,7
SOL 12	1838,0	26,7	6,5	299,8	86,8	12,0	66,3	10,6	517,0	-434,1
SOL 13	2151,4	75,7	54,6	285,3	56,9	44,6	77,7	3,5	491,0	-94,7
SOL 14	1964,4	65,0	49,7	264,0	51,7	42,2	51,3	4,7	629,0	-419,7
BMR	1755,1									
Energy expenditure	2281,6									

A.4: Drinking Water Data

	A1			A2			A3		
Mission Day	Drinking [ml]	Urine [ml]	Difference [ml]	Drinking [ml]	Urine [ml]	Difference [ml]	Drinking [ml]	Urine [ml]	Difference [ml]
1	3 000	2 750	250	2 300	1 100	1 200	1 700	2 700	-1 000
2	3 500	4 600	-1 100	2 300	1 600	700	1 700	2 200	-500
3	3 000	2 600	400	2 300	1 100	1 200	1 700	1 500	200
4	3 000	2 900	100	2 300	1 550	750	1 900	2 200	-300
5	3 000	2 250	750	2 300	1 150	1 150	1 800	1 500	300
6	3 000	1 900	1 100	2 300	1 000	1 300	1 800	1 500	300
7	3 750	3 650	100	1 500	1 300	200	1 700	1 500	200
8	4 000	3 400	600	2 300	1 750	550	1 600	1 400	200
9	2 400	2 600	-200	2 300	1 500	800	1 700	1 250	450
10	2 600	2 550	50	2 300	1 550	750	-	-	-
11	3 000	4 300	-1 300	2 300	1 450	850	-	-	-
12	3 500	3 500	0	1 500	1 700	-200	-	-	-

13	2 500	4 200	-1 700	2 300	2 100	200	-	-	-
14	3 500	4 800	-1 300	1 500	1 600	-100	-	-	-
15									
Total:	**43 750**	**46 000**	**-2 250**	**29 800**	**20 450**	**9 350**	**15 600**	**15 750**	**-150**
Average:	**3 125**	**3 286**	**-161**	**2 129**	**1 461**	**668**	**1 733**	**1 750**	**-17**
Min:	**2 400**	**1 900**	**-1 700**	**1 500**	**1 000**	**-200**	**1 600**	**1 250**	**-1 000**
Max:	**4 000**	**4 800**	**1 100**	**2 300**	**2 100**	**1 300**	**1 900**	**2 700**	**450**

	A4			A5			A6		
Mission Day	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**
1	3 000	2 500	500	3 000	2 200	800	2 500	2 700	-200
2	3 000	2 450	550	3 000	2 250	750	3 000	1 600	1 400
3	3 000	1 850	1 150	2 250	1 650	600	2 900	2 100	800
4	2 000	1 750	250	3 000	1 950	1 050	2 800	2 600	200
5	2 000	1 920	80	3 500	2 400	1 100	4 400	3 000	1 400
6	2 000	2 100	-100	4 500	2 400	2 100	4 700	2 500	2 200
7	2 500	2 400	100	3 000	2 000	1 000	3 200	1 500	1 700
8	3 000	3 500	-500	3 000	2 000	1 000	3 000	1 900	1 100
9	1 500	2 600	-1 100	4 500	3 000	1 500	3 100	2 200	900
10	2 000	1 750	250	4 500	2 950	1 550	3 300	1 400	1 900
11	2 000	2 000	0	3 350	3 000	350	3 700	3 500	200
12	1 500	1 700	-200	3 500	2 450	1 050	3 200	2 300	900
13	2 000	2 000	0	3 000	2 950	50	3 700	3 600	100
14	1 500	2 500	-1 000	3 000	2 850	150	4 200	3 000	1 200
15									
Total:	**31 000**	**31 020**	**-20**	**47 100**	**34 050**	**13 050**	**47 700**	**33 900**	**13 800**
Average:	**2 214**	**2 216**	**-1**	**3 364**	**2 432**	**932**	**3 407**	**2 421**	**986**
Min:	**1 500**	**1 700**	**-1 100**	**2 250**	**1 650**	**50**	**2 500**	**1 400**	**-200**
Max:	**3 000**	**3 500**	**1 150**	**4 500**	**3 000**	**2 100**	**4 700**	**3 600**	**2 200**

	L1			L2			L3		
Mission Day	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**
1	4 590	3 050	1 540	2 470	1 380	1 090	3 535	2 010	1 525
2	5 070	3 400	1 670	2 980	1 940	1 040	2 460	1 425	1 035
3	4 050	2 000	2 050	4 350	910	3 440	4 100	2 235	1 865
4	4 570	1 700	2 870	4 265	1 160	3 105	2 510	1 580	930
5	5 060	2 200	2 860	3 220	1 320	1 900	2 870	1 520	1 350
6	4 250	2 700	1 550	2 880	1 390	1 490	2 750	3 055	-305
7	3 470	2 050	1 420	3 500	1 010	2 490	3 637	1 225	2 412

8	3 420	2 650	770	3 720	930	2 790	3 160	1 335	1 825
9	4 630	2 200	2 430	3 190	1 100	2 090	2 820	1 175	1 645
10	3 450	2 800	650	2 950	1 420	1 530	3 880	1 985	1 895
11	3 210	1 950	1 260	2 550	920	1 630	3 610	2 000	1 610
12	3 220	2 550	670	2 240	770	1 470	2 910	985	1 925
13	3 070	2 300	770	2 680	900	1 780	4 690	1 250	3 440
14	3 240	2 300	940	1 990	670	1 320	3 240	1 030	2 210
15	3 990	1 800	2 190	2 190	1 120	1 070	3 430	2 220	1 210
Total:	**59 290**	**35 650**	**23 640**	**45 175**	**16 940**	**28 235**	**49 602**	**25 030**	**24 572**
Average:	**3 953**	**2 377**	**1 576**	**3 012**	**1 129**	**1 882**	**3 307**	**1 669**	**1 638**
Min:	**3 070**	**1 700**	**650**	**1 990**	**670**	**1 040**	**2 460**	**985**	**-305**
Max:	**5 070**	**3 400**	**2 870**	**4 350**	**1 940**	**3 440**	**4 690**	**3 055**	**3 440**

	L4			L5		
Mission Day	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**	**Drinking [ml]**	**Urine [ml]**	**Difference [ml]**
1	3 840	1 700	2 140	4 050	2 545	1 505
2	5 200	3 800	1 400	5 475	4 140	1 335
3	3 850	3 250	600	6 800	3 400	3 400
4	4 200	2 750	1 450	5 750	2 710	3 040
5	4 000	4 150	-150	5 945	4 290	1 655
6	4 800	3 150	1 650	6 380	5 150	1 230
7	4 500	2 600	1 900	6 250	3 350	2 900
8	3 100	2 100	1 000	6 620	3 450	3 170
9	4 700	2 000	2 700	5 200	4 550	650
10	4 300	2 600	1 700	5 650	4 000	1 650
11	4 200	2 550	1 650	3 990	3 550	440
12	2 800	2 650	150	5 650	2 350	3 300
13	3 500	2 300	1 200	5 320	3 600	1 720
14	4 100	2 400	1 700	5 265	2 700	2 565
15	2 800	2 300	500	3 295	3 900	-605
Total:	**59 890**	**40 300**	**19 590**	**81 640**	**53 685**	**27 955**
Average:	**3 993**	**2 687**	**1 306**	**5 443**	**3 579**	**1 864**
Min:	**2 800**	**1 700**	**-150**	**3 295**	**2 350**	**-605**
Max:	**5 200**	**4 150**	**2 700**	**6 800**	**5 150**	**3 400**

A.5: Utility Water Data

	LEARN Crew					
Mission Day	Utility Water [mL]	Biolab Water [mL]	Num. of toilet flushes	Toilet water (assuming 5 litres/flush) [ml]	Bathroom water [ml]	Waste water [ml]
1	1 875	134	3	15 000		
2	1 162		9	45 000		
3	800		7	35 000		
4	1 500	1 580	8	40 000		1 620
5	2 000	500	4	20 000		
6	576	600	7	35 000		
7	1 000		5	25 000		
8	240	2 900	5	25 000		3 200
9	370		9	45 000		
10	440		3	15 000		
11	200	1 500	5	25 000		4 600
12	350		5	25 000		
13	150	1 600	8	40 000		
14	200	3 000	7	35 000		3400
15	3 100	500	6	30 000		500
16						5 800
Total:	**13 963**	**12 314**		**455 000**	**1600**	**19 120**
Average:	**931**	**1 368**		**30 333**		**2 664**
Min:	**150**	**134**		**15 000**		**500**
Max:	**3 100**	**3 000**		**45 000**		**4 600**

A.6: Shower Water Data

ARES	A1	A2	A3	A4	A5	A6
Mission Day	ml	ml	ml	ml	ml	ml
1	0	1 500	0	0	0	0
2	0	1 500	0	0	500	0
3	0	1 500	1 000	0	0	0
4	0	0	1 000	0	1 000	0
5	0	1 500	700	0	0	0
6	0	0	1 500	0	1 000	0
7	10 000	1 500	700	0	0	0
8	0	0	1 500	0	0	0
9	0	1 500	0	3 000	0	0
10	0	0	700	0	0	0
11	0	1 500	-	0	0	0

12	0	0	-	0	1 000	0
13	0	0	-	0	0	0
14	10 000	0	-	0	0	0
15						
16						
Total:	**20 000**	**10 500**	**7 100**	**3 000**	**3 500**	**0**
Average:	**1 429**	**750**	**710**	**214**	**250**	**0**
Min:	**0**	**0**	**0**	**0**	**0**	**0**
Max:	**10 000**	**1 500**	**1 500**	**3 000**	**1 000**	**0**

LEARN	**L1**	**L2**	**L3**	**L4**	**L5**
Mission Day	ml	ml	ml	ml	ml
1	300	250	400	1 000	250
2	500	350	600	800	350
3	1 000	350	400	700	250
4	800	200	400	700	350
5	3 700	2 300	400	700	1 700
6	500	200	400	800	240
7	700	250	0	2 000	150
8	800	300	400	2 000	450
9	700	200	500	700	400
10	700	300	400	600	300
11	300	450	400	800	350
12	700	350	600	800	650
13	700	0	400	800	500
14	1 200	300	400	800	300
15	700	250	400	800	300
16					
Total:	**13 300**	**6 050**	**6 100**	**14 000**	**6 540**
Average:	**887**	**403**	**407**	**933**	**436**
Min:	**300**	**0**	**0**	**600**	**150**
Max:	**3 700**	**2 300**	**600**	**2 000**	**1 700**

A.7: Sleep Data

LEARN	Length of sleep (hours)				
	L1	**L2**	**L3**	**L4**	**L5**
Day 1	9:30	9:30	8:30	8:49	9:30
Day 2	8:00	8:00	7:45	7:45	7:30
Day 3	7:15	6:40	6:45	7:00	7:00
Day 4	8:00	7:00	8:00	7:30	7:30

Day 5	8:00	8:00	8:00	7:20	8:00
Day 6	6:00	6:05	4:50	5:10	3:20
Day 7	7:10	6:40	7:30	6:35	7:25
Day 8	7:30	7:30	7:30	7:05	7:30
Day 9	7:30	7:25	7:10	5:40	7:15
Day 10	6:40	6:50	6:33	6:20	6:55
Day 11	7:30	7:05	6:40	6:50	7:10
Day 12	8:05	9:15	7:58	7:58	8:00
Day 13	3:00	6:50	3:05	6:25	3:45
Day 14	8:35	5:35	8:35	8:30	8:35
Day 15	7:30	7:30	5:30	3:40	7:30

We experienced issues with the ARES sleep data. For more details, please refer to the data sheet by following the link in the conclusion.

A.8: Total Water Usage Data

All data are available at the following link and can be reused to draw conclusions. In this part, we quickly make some remarks concerning the data, without further analysis.

		ARES-III	**LEARN**
Shower/ washing	Crew total	44.1	46.0
	Ave. per crew member	*7.4*	*9.2*
	Ave. per crew member per day	*0.5*	*0.6*
Drinking	Crew total	215.0 + 65 (food prep.)	295.6
	Ave. per crew member	*46.7*	*59.1*
	Ave. per crew member per day	*3.1*	*3.9*
Toilet flushes (assuming 5L/flush)	Crew total	405.0	455.0
Bathroom water	Crew total	40.0	1.6
Utility water	Crew total	38.0	14.0
BioLab water	Crew total		12.3
Waste water	Crew total	Not recorded	19.2
TOTAL		**807.1**	**843.66**

Shower/washing, drinking consumptions are, as expected, very close in-between the two crew. However there is a difference in the amount of flushes (around 13.5 flushes per crew member for ARES and around 18.2 flushes per crew member for LEARN). It is worth noticing that by choosing to diminish the use of flushes, ARES mission ended up clogging the pipes and had to use much more water to fix it (seen in the utility water). In total, the ARES mission represented an average of 8.9L per person per day, and the LEARN one represented an average of 11,2L.